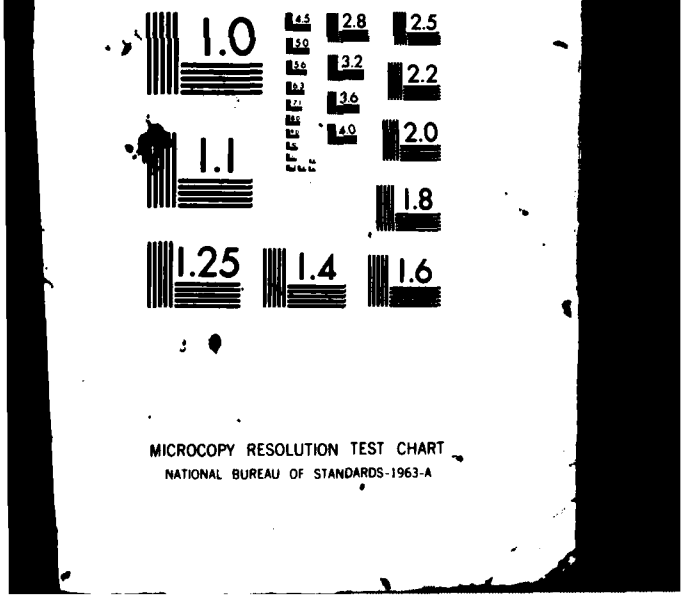
AD-A114 589 INTERNATIONAL LAKE ERIE REGULATION STUDY BOARD F/G 13/2
LAKE ERIE WATER LEVEL STUDY. APPENDIX E. POWER. ANNEX D. COMPUT--ETC(U)
JUL 81

UNCLASSIFIED NL

1458



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

Lake Erie Water Level Study

Copy available to DTIC does not permit fully legible reproduction

DTIC FILE COPY
AD A114589

DTIC ELECTE MAY 19 1982 D

Appendix Power

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

International Lake Erie Regulation Study Board
International Joint Commission

July 1981

82 05 18 080

DISCLAIMER NOTICE

THIS DOCUMENT IS BEST QUALITY PRACTICABLE. THE COPY FURNISHED TO DTIC CONTAINED A SIGNIFICANT NUMBER OF PAGES WHICH DO NOT REPRODUCE LEGIBLY.

SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO. AD-A114589	3. RECIPIENT'S CATALOG NUMBER
4. TITLE *(and Subtitle)* Lake Erie Water Level Study, Appendix E, Power, Annex D: Computer Programs		5. TYPE OF REPORT & PERIOD COVERED Final
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS International Lake Erie Regulation Study Board		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS U.S. Army Engineer District, Buffalo 1776 Niagara Street Buffalo, N.Y. 14207		12. REPORT DATE July 1981
		13. NUMBER OF PAGES 550
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report)
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT *(of this Report)*

Distribution Unlimited

17. DISTRIBUTION STATEMENT *(of the abstract entered in Block 20, if different from Report)*

DTIC ELECTE MAY 19 1982 S D H

18. SUPPLEMENTARY NOTES

19. KEY WORDS *(Continue on reverse side if necessary and identify by block number)*

Hydroelectric Power, Lake Regulation, Water Levels, Great Lakes

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

This Annex is part of Appendix E - Power. Appendix E contains the economic evaluation of Lake Erie regulation plans in terms of their effects on the generation of hydroelectric power on the connecting channels of the Great Lakes and on the St. Lawrence River. It also contains a description of the methodology that was developed for the purpose of carrying out this evaluation. → next page

(continued on reverse side)

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

20. The purpose of Annex D is to document the computer programs that were used for the determination of power output at each of the power plants. The documentation also provides sufficient user instructions to permit the economic evaluation results to be readily reproducible.

ANNEX D - COMPUTER PROGRAMS

APPENDIX E - POWER

LAKE ERIE REGULATION STUDY

REPORT

TO THE

INTERNATIONAL JOINT COMMISSION

BY THE

INTERNATIONAL LAKE ERIE REGULATION

STUDY BOARD

(UNDER THE REFERENCE OF 21 FEBRUARY 1977)

DTIC COPY INSPECTED 2

Accession For
NTIS GRA&I
DTIC TAB
Unannounced
Justification
By
Distribution/
Availability Codes
Dist | Avail and/or Special
A | 23

JULY 1981

SYNOPSIS

This Annex is part of Appendix E - Power. Appendix E contains the economic evaluation of Lake Erie regulation plans 25N, 15S and 6L in terms of their effects on the generation of hydroelectric power on the connecting channels of the Great Lakes and on the St. Lawrence River. It also contains a description of the methodology that was developed for the purpose of carrying out this evaluation.

The purpose of Annex D is to document the computer programs that were used for the determination of power output at each of the power plants. The documentation also provides sufficient user instructions to permit the economic evaluation results to be readily reproducible.

The annex consists of four parts, one for each power system. Each part was prepared by a different agency, which was represented by a member or associate on the Power Subcommittee, and is independent of the other parts. Consequently the format of the presentation of the programs and the detail of the user instructions will vary from one part to another.

Magnetic tapes of the computer software and data as well as a listing of its contents are filed with the Buffalo District Office of the Corps of Engineers and the Canada Centre for Inland Waters in Burlington.

The members or associates of the Power Subcommittee, their affiliated agency, and the power system for which they were responsible are as follows:

Name	Agency	Power System
J. M. Spratt	Ontario Hydro	Ontario
R. Brisbois J. C. Rassam	Hydro Quebec	Quebec
A. Hollmer	Power Authority of the State of New York	New York State
B. G. DeCooke	U.S. Army Corps of Engineers Detroit District	Upper Michigan

TABLE OF CONTENTS

ANNEX D

COMPUTER PROGRAMS

	Page
SYNOPSIS	i
TABLE OF CONTENTS	ii
PART 1 - ONTARIO SYSTEM	
PART 2 - QUEBEC SYSTEM	
PART 3 - NEW YORK STATE SYSTEM	
PART 4 - UPPER MICHIGAN SYSTEM	

ANNEX D - COMPUTER PROGRAMS

PART 1 - ONTARIO SYSTEM

ANNEX D - COMPUTER PROGRAMS

PART 1 - ONTARIO SYSTEM

TABLE OF CONTENTS

SECTION 1.0	General Description	1
	Magnetic Tape Description	1
SECTION 2.1	ST. MARYS COMPUTER PROGRAM	3
	Inputs	3
	Outputs	4
	Program Execution Runstream	5
SECTION 2.2	NIAGARA RIVER COMPUTER PROGRAM	8
	Inputs	8
	Outputs	11
	Program Execution Runstream	13
SECTION 2.3	ST. LAWRENCE RIVER COMPUTER PROGRAM	14
	Inputs	14
	Outputs	16
	Program Execution Runstream	17
SECTION 2.4	SUMMARY COMPUTER PROGRAM	20
	Inputs	20
	Outputs	22
SECTION 3.0	PROGRAM LISTING	44
	St. Marys	45
	Niagara	71
	St. Lawrence	222
	Summary	287
SECTION 4.0	SAMPLE INPUT	318
	St. Marys Base Case	319
	Niagara Base Case	325
	St. Lawrence Base Case	332

SECTION 5.0 SAMPLE OUTPUT 336

St. Marys 337
Niagara 348
St. Lawrence 377
Summary 394

SECTION 1.0

General Description

The power output from the Ontario System was analyzed by a series of three major FORTRAN IV computer models that simulated the determination of energy and peak capacity as described in Appendix E. These will be referred to in this annex as the St. Marys, Niagara, and St. Lawrence computer programs.

In addition, a summary program was used to summarize system totals for daytime, nighttime, and monthly total average output (MW), total energy output (MWh), and peak output (MW). The summary program uses as input data, a current masterfile tape generated as part of the output of the three computer models. In this way, data is transferred from the models to create a summary listing.

The above four basic programs plus three additional programs were used to run the Lake Erie Regulation Study and the Diversion and Consumptive Uses Study. The additional programs were special cases of the original program modified to meet the required conditions.

One modified program for the Lake Erie Regulation Study was developed. The modified program, replaced the original St. Lawrence program when Category 3 conditions were run. (See Table 1A for the programs required to run the Lake Erie Regulation plans.)

Two modified programs for the Diversion and Consumptive Uses Study were developed. The modified programs, replaced the original Niagara program when diversion scenarios 6, 9, 12 and 13 conditions were run. (See Table 1B for the programs required to run the Diversion and Consumptive Uses diversion scenarios.)

Once the original programs ha' been replaced with the modified versions, all user instructions are common for any run except where noted in the manual. Each alternative requires the St. Marys program, a Niagara program, a St. Lawrence program and the Summary program. Of course, any one of the St. Marys, Niagara or St. Lawrence programs may be run with the Summary program to produce results for part of any alternative required.

Magnetic Tape Description

The seven computer programs are listed in their respective sections of this report and are provided on a labelled tape 'LERSPRG', reel number 52857, blocked in the order - St. Marys (STMARY), Niagara (NIAG1), Niagara 12 and 13 (NIAG2), Niagara 6 and 9 (NIAG3), St. Lawrence (STLPRG), St. Lawrence Category 3 (STLPRG3) and Summary (SUMMARY). This tape has been created on the Ontario Hydro Univac 1100/82 computer at 6250 fpi.

An additional two data tapes are provided containing all data sets required for the Lake Erie Regulation Study and the Diversion and Consumptive Uses Study. These labelled tapes 'LERSDATA' and 'DUCDATA' are on reel numbers 32969 and 29655 at 6250 fpi. Table 1C and 1D provides a summary of the location of each individual data file required to run each Lake Erie Regulation Study plan and each Diversion and Consumptive Uses diversion scenario.

A current masterfile tape is also provided. The current masterfile tape contains all records of the data required for the Summary program from all past runs of the St. Marys, Niagara, and St. Lawrence programs. This data is in binary form blocked under like titles for each regulation scheme. The format of this data is described under Section 2.4 Summary Program Reports. The unlabelled masterfile tape 'NEWMASTER' is reel number 27141 and is at 1600 fpi.

The most current masterfile must be assigned to each batch run. This is described in each section under program execution. The output from the batch runs results in the creation of a new masterfile to be used as the most current masterfile for the next batch run or for input to the Summary program. In this way, the masterfile tape is continually updated by each batch run to contain the most current data for any Regulation Scheme with like titles. In the case where no like title already exists, a new record is written onto the current masterfile. In order to run the Summary program, data covering the same period of record for each of the St. Marys, Niagara, and St. Lawrence programs must exist on the current masterfile from past runs, blocked under identical heading titles.

If using an equivalent Univac System, instructions in the Univac Exec 8 Control Language are provided under Program Execution Runstream for each program described above. If using a different computer system, compatible operating software must be written by the user. In this case, this report will be a guide for the various operations required.

SECTION 2.1

ST. MARYS RIVER PROGRAM - INPUTS

.0 Control Cards are of 4 types, see Tables 2 and 3 for format and amples.

a) Header Card: This must be the first card in the deck. It contains a description which will be written on each page of the output and also identifies the run on the masterfile tape. This description serves as the title and must be the same in the three programs - St. Marys, Niagara and St. Lawrence, for each scheme run.

Cols 1-16 - Description of data.

b) Lake Huron Data Cards: These cards follow the header card. One card contains the monthly Lake Huron levels for one year, the maximum number of years being 100.

Cols 1-4 - Year
Cols 11-15 - Lake Huron Level for January (ft x 100)
Cols 16-20, 21-25, ---, 66-70, - Lake Huron levels for other months.

c) Lake Superior Data Cards: These cards follow the sentinel card which follows the Lake Huron data cards. Two cards contain the monthly Lake Superior levels and outflows for one year, the maximum number of years being 100.

First Card - contains data for January to June.

Cols 1-4 - Year
Cols 5-6 - '01'
Cols 11-15 - Lake Superior Level for January (ft x 100)
Cols 16-20 - Lake Superior outflow for January (cfs/10)
Cols 21-25 - 26-30, ---, 66-70, - Remaining Lake Superior Levels and outflows.

Second Card - contains data for July to December.

Cols 1-4 - Year
Cols 5-6 - '07'
Cols 11-15, 16-20, ---, 66-70, - Lake Superior levels and outflows.

d) Sentinel Card: One after Lake Huron cards and one after Lake Superior cards.

Cols 1-4 - '9999'

ST. MARYS RIVER PROGRAM - OUTPUTS

1.0 A report containing a line for each month with the following information:

Date (year and month))
Lake Superior Level (ft)) Input
Lake Superior Outflow (cfs))
Lake Huron Level (ft))
Great Lakes Headwater Elevation (ft)
Great Lakes Tailwater Elevation
Great Lakes Head (ft)
Great Lakes Output (MW)
Total Output (MW)

2.0 Duration listings for each month for the following:

Lake Superior Level (ft)
Lake Superior outflow (cfs)
Lake Huron Level (ft)
St. Marys River total output (MW)

3.0 Duration listing of the total energy output for each year.

4.0 An updated master file containing the calculated monthly total outputs. The format of this tape is described in the summary program input section.

Samples of the output results are attached. (See Section 5.0.)

ST. MARYS PROGRAM - PROGRAM EXECUTION RUNSTREAM

In order to execute the St. Marys program on the Univac Computer System, a batch mode runstream must be created as a fastrand file and executed under batch mode. Table 4 provides a copy of a batch runstream and each card is described below. In general, lower case letters are used to indicate the items which change from run to run.

1.0 Batch run statement:

@RUN,P xddddd, xxxxxx/DSR Code, qualifier, max time, max pages.

where the run statement is set up as per Exec 8 control language standards where 'p' is batch priority, 'xddddd' is run-identification, 'xxxxxx' is account number, DSR code identifies the user, qualifier identifies your system workspace, maximum time and maximum pages default values are specified.

2.0 The program tape is assigned by:

@ASG,S prog., U9S, ppppp

where 'prog' is the program tape name, 'ppppp' is the program tape number. 'S' specifies a 6250 fpi density option for a labelled tape, and 'U9S' gives the equipment type for this tape density.

3.0 The input master tape is assigned by:

@ASG,TJ old., U9V, ddddd

where 'old' is the old master tape name and 'ddddd' is the old master tape number. This tape must have been created as the output tape in a previous run of one of the Lake Erie Regulation programs. 'TJ' specifies an unlabelled 1600 fpi tape and 'U9V' gives the equipment type.

4.0 The output master tape is assigned by:

@ASG,TJ new., U9V

where 'new' represents the tape name which will appear on the tape label and on the returned 'buff-card'. This tape will be used as the input master tape to the next run of one of the Lake Erie Regulation Programs.

5.0 The input data tape is assigned by:

@ASG,S datatape., U9S, xxxxx

where 'datatape' is the lable name of the tape containing the data file to be executed and 'xxxxx' is the tape reel number.

6.0 The print tape is assigned by:

@ASG,TJ print., U9V

where 'print' is the name of the printfile tape to be used to contain the printable output.

7.0 The input master tape is identified to the computer as Fortran unit 8 by:

@USE 8., old.

8.0 The output updated master tape is identified as Fortran unit 9 by:

@USE 9., new.

9.0 A temporary fastrand file is created to hold the program elements to be copies from the program tape by:

@ASG,T stm.

where 'stm' is the name of the fastrand file.

10.0 If the program does not occupy file 1, of the program tape, then the tape must be positioned by:

@MOVE prog., nn

where 'nn' represents the number of files to skip over on the program tape.

11.0 The St. Marys program elements are copies into the temporary file by:

@COPY, G prog., stm.

12.0 A temporary fastrand file is created to hold the data input file to be copied from the data tape by:

@ASG,T data.

where 'data' is the name of the data file.

13.0 If the data file required from the data tape does not occupy file 1, the tape may be moved 'nn' records to the proper file required by:

@MOVE datatape., nn

where 'nn' represents the number of files to skip over on the data tape.

14.0 The data element for the St. Marys program run is copied into temporary file 'data' with the following statement:

```
@COPY,G datatape., data.
```

15.0 The program tape and data tape are freed from the system by the following statement:

```
@FREE   prog.
@FREE   data.
```

16.0 The printable output is transferred from direct printing onto a high speed printer, to magnetic tape record by the following statement:

```
@BRKPT PRINT$/print
```

where 'PRINT$' is the system printfile assigned by the Univac System to every run and may be directed to devices other than a high speed printer.

17.0 The St. Marys program is executed by the following statement:

```
@XQT stm.XQT
```

18.0 The run data file is added to the execution, to be read into the program as input by:

```
@ADD data.
```

19.0 The printape transfer of all printable output is completed by the statement:

```
@BRKPT PRINT$
```

20.0 The printape is printed on the high speed printer by the following command:

```
@PRINT print.
```

21.0 The runstream is ended by:

```
@FIN
```

The result of a run executed in the above manner is a hardcopy printout of the program output, a magnetic tape containing the hardcopy for future printing, and a new magnetic tape masterfile containing the required output used from this run as input data for the summary program using the title established as the header card in the input data card deck. For any particular scheme each of the three programs - St. Marys, Niagara, and St. Lawrence, should have the same title in their header cards. Then, when the Summary program is run, the title specified will be this common title. The Summary program will search for this common title on the input masterfile tape.

SECTION 2.2

NIAGARA RIVER PROGRAM - INPUTS

1.0 Control cards are of 8 types with 7 types in the first deck, and one type in a separate deck: See Tables 5, 6, 7 and 8 for examples.

2.0 First Deck

(a) Heading Card

The first card in the first deck.

Cols 2-16 Heading which appears on each page of the output and is used also to identify the data used in the master file tape.

(b) Report Option Card

The second card sets the various options and report types available in the program.

Col 1 Report number. The number inserted here provides various types of output. For a listing of the options see Table 9.

Col 3 ITW. This variable gives the option of inputting Lake Ontario elevations as the second data deck (ITW=1) or not inputting Lake Ontario elevations (ITW=0). In which case, the program calculates Beck Tailwater elevation based on a Lake Ontario mean Level of 244.5 feet.

Col 5 IP constant always set=1.

Col 7 Month start option. Normally this is set to 1 to indicate data starts at January.

Col 9-10 Month End option. Normally set to 12 to indicate December.

Col 12-13 ISCH. Flag to indicate which Lake Erie Regulation Study plan or which Diversion and Consumptive Uses diversion scenario is currently being run:

ISCH = -1 for 1958 plan

ISCH = 0 for 6L plan

ISCH = 1 for Base Case and 25N plan

ISCH = 2 for D.C.U. diversion scenario

Col 15-18 VARI. Variation in flow diversion between Canada and the United States. This is set to 5 000 cfs, so that Canada's share becomes + 2 500 and the US share is - 2 500 cfs.

(c) Falls Flow Daytime Card

Cols 1-80 Daytime monthly average Niagara Flow allotment as defined under the Treaty. One value for each month in open format.

(d) Falls Flow Nighttime Card

Cols 1-80 Same as Card C but for nighttime falls flow conditions.

(e) Lake Erie Outflow Adjustment Card

Cols 1-80 Monthly average adjustment to Lake Erie outflows as defined under methodology report Table F-4 in open format.

(f) Material Dock Elevation Card

Cols 1-80 Monthly average Material Dock elevations in open format. Normally set equal to a constant 561.0 for each month for Lake Erie Regulation study.

(g) Data Cards

Two cards for each year for a maximum of 100 years.

1st Card

Cols 1-4 Year.

Cols 5-6 '01' indicating that the card contains data for the months between January to June.

Cols 11-15 Lake Erie Level for January in feet x 100 read as (F5.2).

Cols 16-20 Lake Erie Outflow for January in cfs/10 (F5.0).

Cols 21-70 Lake Erie levels and Outflows for February to June.

2nd Card

The same as the first card but covering the months July to December.

Cols 5-6 '07' indicating that the data begins at the month July.

3.0 Second Deck

If Column 3 of Card B in the First deck indicates a '1', then the program expects a second input deck giving Lake Ontario levels for the data period given in the first deck. See Tables 7 and 8 for an example.

(a) Lake Ontario

Cols. 1-4 Year

Cols. 11-15 Lake Ontario Level for January written as feet x 100 (F5.2).

Cols. 16-70 Lake Ontario levels for February to December.

The total number of years of data in the second data set must be the same as in the first data set.

4.0 Current Master File

This tape file is input for the same purpose as described under the operating instructions.

Samples of the output results are attached. (See Section 5.0.)

NIAGARA RIVER PROGRAM - OUTPUTS

Under the report option IR=2 as described in Input Data, 2 B Table 9 the following output is generated by the program.

1.0 Input Data Variables Summary

A single sheet report summarizing the options and variables used on the input cards as follows:

Report Type
Plot Type
Flow over Niagara Falls daytime/nighttime by months
Monthly Flow Adjustments
Monthly Material Dock Elevations

2.0 General Chronological Calculations

A report producing one page per year of input data containing the following information.

Year/Month
Tourist Season/Non Tourist Season
Daytime/Nighttime
Lake Erie Outflow
Lake Erie Adjusted Outflow
Grass Island Pool Inflow
Canadian Flow Diversion for Power
PASNY Flow Diversion for Power
Decew Flow Diversion
Beck and Cascades Flow
Beck Flow
Ontario Power Flow
Canadian Niagara Power Flow
Canadian Energy Output in MW for: Decew, Beck,
OP, CNP, and System Total

3.0 Duration Listings by Months for the Following

Lake Erie Outflow (cfs)
Overall System Peak (MW)
Daytime Energy (Av. MW - Operating Hours)
Nighttime Energy (Av. MW - Operating Hours)
Total System Energy (Av. MW - Operating Hours)
Annual Daytime Total Energy (MWh)
Annual Nighttime Total Energy (MWh)
Annual System Energy (MWh)

4.0 Chronological Peak Outputs (MW)

A report giving Peak Output for the following Stations: OP, CNP, Decew, Beck, Total System, Adjusted Total (Total-75 MW).

5.0 An updated master file containing the calculated monthly total outputs for daytime, nighttime, and peak energy.

NIAGARA RIVER PROGRAM - PROGRAM EXECUTION RUNSTREAM

In order to execute the Niagara program on the Univac Computer System, a batch mode runstream, similar to the one discussed under the St. Marys program, must be developed. Table 10 provides a copy of the batch runstream required.

The batch runstream is identical to that used for the St. Marys program with the following exceptions:

(a) If the ITW switch in the data indicates that Lake Ontario levels are to be read in, two temporary data files with two different names must be copied from the data tape, one for each of two decks described under inputs.

(b) If Lake Ontario levels are used, they must be assigned a Fortran Unit number by inserting the following statement after the tape copy:

@USE 10., filename.

where '10' is the logical Fortran read statement number and 'filename' is the temporary filename assigned to the Lake Ontario levels file.

(c) The execute statement for the Niagara program is:

@XQT NIAG1.LOAD

SECTION 2.3

ST. LAWRENCE RIVER PROGRAM - INPUTS

1.0 Control Cards are four types, See Tables 11 and 12 for examples.

(a) Heading Card

The first card in the first deck.

Cols. 1-16 Heading which appears on each page of the output and is used also to identify the data used written on tape.

(b) Adjustment Card

The second card in the deck.

Cols. 1-6 Adjustment to Lake Ontario Level for each 'month' or part 'month'.
in feet, with two decimals (F6.2).
use '-' sign, if it is reduction, otherwise '+' or addition is assumed.

Cols. 7-12 Adjustment to Lake Ontario Outflow for each 'month' or part 'month'.
in CFS (I6), no multiplying factor is assumed.
use '-' sign for reduction, otherwise '+' or addition is implied.

NOTE: An adjustment card is always necessary. For the Lake Erie Regulation Study and Diversiosn and Consumptive Uses no adjustments are necessary, insert a blank card or set the values equal to zero.

(b-1) Category 3 Flag Card

For St. Lawrence runs under Category 3, the program 'STPLRG3' is used which requires an additional card at this point.

Cols. 1-2 Flag 'IFFF' for Category 3:

IFFF=1 for Adjusted Base Case and 6L plan
IFFF=2 for 25N plan
IFFF=3 for 15S plan

(c) Data Cards

Two cards for each year for a maximum of 130 years.

1st Card

Cols. 1-4	Year
Cols. 5-6	'01' indicating that the card contains 7 sets of values - for January, February, March, April 01-15, April 16-30, May and June.
Cols. 11-15	Lake Ontario Level for January. in ft x 100 (F5.2) should be between 235.00 and 250.00 ft.
Cols. 16-20	Lake Ontario Outflow for January. in cfs/10 (I5) should be between 150,000 and 350,000 cfs.
Cols. 21-80	Ontario Levels and Outflows for February to June.

2nd Card

Similar to first card except that the values are for different months.

Cols. 5-6	'08' indicates that the card contains 7 sets of values - for July, August, September, October, November, December 01-15, December 16-31.

(d) Sentinel Card

Cols. 1-4	'9999' - This must be the last card in the deck.

ST. LAWRENCE RIVER PROGRAM - OUTPUTS

1.0 A report containing the following on each line:

Date)
Lake Level (Ft.))Input
Lake Outflow (cfs))
Head water level (ft)
Daytime average output (MW)
Daytime energy (MWh)
Nighttime energy (MWh)
Peak output (MW)
Monthly average (MW)

Fourteen of these sets are produced for each year.

2.0 Duration listings for each of the 14 periods in a year for the following:

Lake level (ft)
Head Water Level (ft)
Lake Outflow (cfs)
Daytime output (MW)
Nighttime output (MW)
Peak output (MW)
Average monthly output (MW)

3.0 There is also a duration listing of the total energy outputs for each year. In calculating this the first value for April and December is used for the first 15 days, the second for the remaining period. Allowance is made for leap year.

4.0 A tape with the daytime, nighttime and peak output for each month for Saunders GS. The average values of two April and December readings are used. This tape is used as input to a program which produces a report of the total monthly output by summing the Niagara, Saunders and St. Marys outputs.

Samples of the output results are attached. (See Section 5.0.)

ST. LAWRENCE RIVER PROGRAM - PROGRAM EXECUTION RUNSTREAM

ıe following cards are required in the runstream for the St. Lawrence *rogram. In general,* lower case letters are used to indicate the items hich change from run to run, see Table 13 for an example runstream.

.0 The program tape is assigned by:

ASG,S prog., U9S,ppppp

here 'ppppp' represents the number of the program tape (or MIT).

!.0 The input master data tape is assigned by:

@ASG,TJ oldmaster., U9V,ddddd

where 'ddddd' represents the number of the input data tape. This tape must have been created as the output tape *in a previous* run of one of the Great Lakes programs.

3.0 The output master data tape is assigned by:

@ASG,TJ newmaster., U9V

where 'newmaster' represents the tape-name which is to appear on the tape label and on the 'buff card'.

4.0 The print tape is assigned by:

@ASG,TJ printape., U9V

where 'printape' represents the tape-name to appear on the label and 'buff-card'.

5.0 The tape containing data for each run is assigned by:

@ASG,S datatape., U9S, ddddd

6.0 If for the required run, the data file is not at location 1 the tape must be moved with the @MOVE statement as described under the St. Marys program execution.

7.0 A temporary data file is assigned by:

@ASG,T stldata.

8.0 The data is copied by:

@Copy,G datatape., stldata.

9.0 The input master data tape is identified to the program as FORTRAN unit 8 by:

```
@USE 8.,oldmaster.
```

10.0 The output master data tape is identified as unit 9 by:

```
@USE 9.,newmaster.
```

11.0 If the program does not occupy file 1 of the program tape, then the tape must be positioned by:

```
@MOVE prog.,nn
```

where 'nn' represents the number of files to skip over on the program tape.

12.0 The temporary program file is assigned by:

```
@ASG,T stl.
```

13.0 The program modules are copied into the temporary program file 'stl' by:

```
@COPIN Pro.., stl.
```

14.0 The program tape is released by:

```
@FREE prog.
```

15.0 The printout from the program is directed to the printape by:

```
@BRKPT PRINT$/printape
```

This procedure allows multiple copies of the printout to be produced after completion of the run.

16.0 Execution of the program is started by:

```
@XQT stl. XQT
```

17.0 The data file is added by:

```
@ADD stldata.
```

18.0 After the program execution has been completed, the printout is directed back to the on-line printer by:

```
@BRKPT PRINT$
```

19.0 The print tape is released by:

@FREE printape.

20.0 The input data tape is released by:

@FREE oldmaster.

21.0 The output data tape is released by:

@FREE newmaster.

22.0 The printout output is printed by:

@PRINT printape.

23.0 The run is finished by:

@FIN

SECTION 2.4

SUMMARY PROGRAM - TOTAL OUTPUTS FROM ALL PLANTS: INPUTS

1.0 The input cards are of two types.

(a) Study Description

These cards contain the study name, the control code and the year range desired. There may be one or more Type A cards in a run. If there are two or more cards they should be arranged in alphabetical order of study name to save time in finding the studies on the master file tape. See Tables 14 and 15 for an example.

Cols. 1-16 Study name for which reports are required.

Cols. 17-20 Control code
'AVMW' for average monthly output for all three plants.
'PK3' for combined peak output of all three plants.
'PK2' for combined peak output of Saunders and St. Marys only.

Cols. 21-24 Earliest year required for study.

Cols. 25-28 Latest year required.

(b) Sentinel Card

One card is required, to be placed after the type A cards.

Cols. 1-4 '9999'

Examples of the input cards are shown on Table 14 and 15.

2.0 The Master File on tape as generated by the three programs. The format of the tape is described below:

1st record: 6 words
study identification (4 words)
plant code (1 word)
no. of years in study (N) (1 word)

2nd record to (N+1)th record - 37 words each year (1 word)
daytime monthly output (12 words)
nighttime monthly output (12 words)
peak monthly output (12 words)

The above pattern is repeated for each study, the studies being arranged on the tape in sequence according to the study and the plant code.

Last record - 6 words, each containing '999999'.

SUMMARY PROGRAM - TOTAL OUTPUTS FROM ALL PLANTS: OUTPUTS

1.0 If 'AVMW' option is used on the control card then duration listings are produced for each month of the totals for all three plants of the daytime power (MW), nighttime power (MW) and monthly average output (MW). Also a duration listing is produced of the total energy output (MWH) for each year.

2.0 If 'PK3' option is used on the control card, then duration listings are produced for each month of the peak output from all three plants.

3.0 If 'PK2' option is used on the control card, then duration listings are produced for each month of the peak output from the Saunders and St. Marys plants.

Samples of the outputs are attached. (See Section 5.0.)

SUMMARY PROGRAM - PROGRAM EXECUTION RUNSTREAM

The following cards are required in the runstream for the summary program. In general, lower case letters are used to indicate the items which change from run to run. See Table 16 for examples.

1.0 The program tape (or MIT) is assigned by:

```
@ASG,S prog.,U9S,ppppp
```

where 'ppppp' represents the number of the program tape (or MIT).

2.0 The input master data tape is assigned by:

```
@ASG,TJ oldmaster.,U9V,ddddd
```

where 'ddddd' represents the number of the input data tape. This tape must have been created as the output tape in a previous run of one of the Lake Erie Regulation.

3.0 The print tape is assigned by:

```
@ASG,TJ printape.,U9V
```

where 'printape' represents the tape-name to appear on the label and 'buff-card'.

4.0 The input data tape is identified to the program as FORTRAN unit 8 by:

```
@USE 8., oldmaster.
```

5.0 If the program does not occupy file 1 of the program tape, then the tape must be positioned by:

```
@MOVE PROG.,nn
```

where 'nn' represents the number of files to skip over on the program tape.

6.0 The temporary file is assigned to call the program elements from the program tape by:

```
@ASG,T summ.
```

7.0 The program modules are copied into the temporary program file 'summ' by:

```
@COPY,G prog., summ.
```

8.0 The program tape is released by:

```
@FREE prog.
```

9.0 The printout from the program is directed to the print tape by:

```
@BRKPT PRINT$/printape
```

This procedure allows multiple copies of the printout to be produced after completion of the run.

10.0 Execution of the program is started by:

```
@XQT summ.XQT
```

11.0 Data cards are supplied by their user (see Summary Input Section).

12.0 After the program execution has been completed, the printout is directed back to the on-line printer by:

```
@BRKPT PRINT$
```

13.0 The input data tape is released by:

```
@FREE oldmaster.
```

14.0 The summary output is printed by:

```
@PRINT printape.
```

15.0 The runstream is ended by:

```
@FIN
```

Table 1A

Lake Erie Regulation Study

Programs Required to Run Different Plans

Scheme	STMARY	NIAG1	STLPRG	STLPRG3	SUMMARY
BC	X	X	X		X
25N Category 1	X	X	X		X
25N Category 2	X	X	X		X
25N Category 3	X	X		X	X
6L Category 1	X	X	X		X
6L Category 2	X	X	X		X
6L Category 3	X	X		X	X
15S Category 1	X	X	X		X
15S Category 2	X	X	X		X
15S Category 3	X	X		X	X
BC ADJ.	X	X		X	X

Table 1B

Diversion and Consumptive Uses

Programs Required to Run Different Diversion Scenarios

Study No	STMARY	NIAG1	NIAG2	NIAG3	STLPRG3	SUMMARY
BC	X	X			X	X
1	X	X			X	X
5	X	X			X	X
6	X			X	X	X
7	X	X			X	X
8	X	X			X	X
9	X			X	X	X
10	X	X			X	X
11	X	X			X	X
12	X		X		X	X
13	X		X		X	X

Table 1C

Lake Erie Regulation Study

Location of Data Files for Input Data Tape No. 32969, labelled 'LERSDATA'

Regulation Scheme	St. Marys	Niagara-Deck 1	Niagara-Deck 2	St. Lawrence
BC	1	2	3	4
25N Category 1	5	6	7	8
25N Category 2	9	10	11	12
25N Category 3	13	14	15	16
6L Category 1	17	18	19	20
6L Category 2	21	22	23	24
6L Category 3	25	26	27	28
15S Category 1	29	30	31	32
15S Category 2	33	34	35	36
15S Category 3	37	38	39	40
ADJ. BC				41

Table 1D

Diversion and Consumptive Uses

Location of Data Files for Input Data Tape No. 29655, labelled 'DCUDATA'

Study No	Alternative	St. Marys	Niagara-Deck 1	Niagara-Deck 2	St. Lawrence
BC	R-1	1	2	3	4
1	R-4	5	6	7	8
5	R-2	9	10	11	12
6	R-10	13	14	15	16
7	R-3	17	18	19	20
8	R-5	21	22	23	24
9	R-11	25	26	27	28
10	R-8	29	30	31	32
11	R-6	33	34	35	36
12	R-7	37	38	39	40
13	R-9	41	42	43	44

general purpose card punching form

system: TABLE 2 - ST. MARYS RIVER - DATA FORMAT	punching instructions: written as / punch as	punch code: IBM 360 / X graph 1108	sheet

HEADING

LAKE HURON LEVELS : 1 CARD PER YEAR (LAKE LEVELS READ AS XXX.XX FT.)

YYYY	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
9999												

LAKE SUPERIOR LEVELS AND FLOWS : 2 CARDS PER YEAR (LAKE LEVELS READ AS XXX.XX FT)

YYYY01	LEVEL	FLOW	LEVEL	FLOW	LEVEL	FLOW	LEVEL	FLOW	LEVEL	FLOW	LEVEL	FLOW
	FT.	CFS/10										
	JAN		FEB		MAR		APR		MAY		JUNE	

YYYY07	LEVEL	FLOW	LEVEL	FLOW	LEVEL	FLOW	LEVEL	FLOW	LEVEL	FLOW	LEVEL	FLOW
	JULY		AUG		SEPT		OCT		NOV		DEC	

9999

general purpose card punching form

system	punching instructions	punch code	sheet
TABLE 3 - ST. MARYS RIVER - DATA EXAMPLE *	written as	IBM 360	of
program	punch as	X univac 1108	
programmer / date			

field identification

```
1532-CAT 2
1900      57826578275783257845578645788867919579345794657945579495793 0
1901      57615576085762057650576795770957720577205771557710576995770 4
9999
190001    60136 830060116 830060098 830060092 820060102114006010011400
190007    60108114006013811700601761210060191123006016712000601 30 8300
190101    59866 550059846 550059836 560059836 550059850 580059882 5800
190107    59916 580059942 580059967 580059986 580059990 580059986 5500
9999
```

* THIS DATA IS A SAMPLE ONLY - IT HAS NO RELATION TO THE ACTUAL DATA USED IN THE STUDY

57477 rev. 6 - 67

TABLE 4 ST. MARY'S RIVER PLANTS - BATCH MODE RUNSTREAM EXAMPLE

```
@RUN,U/RPS XLERIE,AN9998/GWTP,HSTG4,10,300
@ASG,S  PROG.,U9S,31682
@ASG,TJ OLDMASTER.,U9V,79378
@ASG,TJ NEWMASTER.,U9V
@ASG,S  DATA.,U9S,47195
@ASG,TJ PRINTAPE.,U9V
@USE    8.,OLDMASTER.
@USE    9.,NEWMASTER.
@ASG,T STMARY.
@COPY,G PROG.,STMARY.
@ASG,T INPUT.
@MOVE  DATA.,7
@COPY,G DATA.,INPUT.
@FREE  PROG.
@FREE  DATA.
@BRKPT PRINT$/PRINTAPE
@XQT   STMARY.XQT
@ADD   INPUT.
@BRKPT PRINT$
@PRINT PRINTAPE.
@MSG PLEASE PRINT TAPE PRINTAPE ON 11X15 PAPER
@FIN
```

general purpose card punching form

system: TABLE 5 - NIAGARA RIVER PLANTS - DECK 1 DATA FORMAT
program:
programmer: date:
punching instructions: written as / punch as
punch code: ☐ IBM 360 ☒ univac 1108 ☐
sheet: of

field identification

1 2 11 16 21 31 41 51 61 71 72 80

HEADING

X X I X XX -X XXXX

- VARIATION XXXX CFS
- REGULATION SCHEME OPTION
- MONTH START/END
- ITW FLAG
- REPORT OPTION

FALLS FLOW DAYTIME - OPEN FORMAT, ONE SPACE BETWEEN EACH OF 12 VALUES

FALLS FLOW NIGHTTIME - SAME AS ABOVE

LAKE ERIE ADJUSTMENTS - OPEN FORMAT AS ABOVE

MATERIAL DOCK ELEVATION - OPEN FORMAT AS ABOVE

LAKE ERIE FLOWS AND LEVELS (LAKE LEVELS READ AS XXX.XX FT)

YYYY01 | LEVEL | FLOW | LEVEL | FLOW | LEVEL | FLOW | LEVEL | FLOW | LEVEL | FLOW | LEVEL | FLOW

FT. CFS/10

JAN FEB MAR APR MAY JUNE

YYYY07 | LEVEL | FLOW | LEVEL | FLOW | LEVEL | FLOW | LEVEL | FLOW | LEVEL | FLOW | LEVEL | FLOW

JULY AUG SEPT OCT NOV DEC

87477 rev. 6-67

general purpose card punching form

system	* punching instructions	punch code	sheet
TABLE 6 - NIAGARA RIVER PLANTS - DECK 1 DATA EXAMPLE	written as	IBM 360	
program		X univac 1108	of
programmer / date	punch as		

field identification

```
15S2-CAT 2
2 1 1 1 12 -1 5000
50600 50600 50600 100600 100600 100600 100600 100600 100600 100600 50600 50600
50600 50600 50600 50600 50600 50600 50600 50600 50600 50600 50600 50600
3100 2800 3500 -300 -4100 -4500 -4400 -4500 -4200 -4100 -3400 1200
561. 561. 561. 561. 561. 561. 561. 561. 561. 561. 561. 561.
190001    57040183565696518411570021929157040199205705920806570612068 4
190007    57057202535705720361570311995557008195975699119367569951948 1
190101    56984188655694918092569401784056975185985697819131570181980 9
190107    57035197895702419693570181969656986189425697118754569701877 7
```

* THIS DATA IS A SAMPLE ONLY - IT HAS NO RELATION TO THE ACTUAL DATA USED IN THE STUDY

general purpose card punching form

system: TABLE 7 - NIAGARA RIVER PLANTS - DECK 2 DATA FORMAT

program:

programmer: date:

punching instructions: written as: punch as:

punch code: [ ] IBM 360 [X] univac 1108 [ ]

sheet: of

field identification

1 2 11 16 21 31 41 51 61 71 72 80

LAKE ONTARIO LEVELS CARDS (LEVELS READ AS XXX.XX FT)

YYYY	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
	FT X 100											

57477 rev. 8-67

general purpose card punching form

system	punching instructions	punch code	sheet
TABLE 8 - NIAGARA RIVER PLANTS - DECK 2 EXAMPLE *	written as	IBM 360	of
program	punch as	X univac 1108	
programmer / date			

field identification

1 2	11	16	21	31	41	51	61	71	80
1900	24376	24381	24401	24513	24487	24483	24461	24501	24521	24518	24497	24431
1901	24456	24490	24501	24513	24496	24455	24432	24417	24439	24410	24392	24365

* THIS DATA IS A SAMPLE ONLY - IT HAS NO RELATION TO THE ACTUAL DATA USED IN THE STUDY

Table 9 Niagara River Plants - Report Options

Report No.		Description of Output
1	(a)	Chronological Flow and Power Table
	(b)	Chronological Energy (MWH) Table
2		Lake Erie Regulation Study Output - See 'Niagara River Plants - Outputs' for a Description
3		Report 1 -
	(a)	Plus
	(b)	Annual Total Energy (MWH) Duration
	(c)	Duration of Power (Av. Mw) by Station by Month
4	1.(a)	Plus
	1.(b)	Plus
	(c)	Monthly Daytime Power (Av. Mw) Duration
	(d)	Monthly Nightime Power (Av. Mw) Duration
	(e)	Monthly Total Power (Av. MW) Duration
	(f)	Annual Daytime Total Energy (MWH) Duration
	(g)	Annual Nightime Total Energy (MWH) Duration
	(h)	Annual Total Energy (MWH) Duration
5		Report 1 -
	(a)	Plus
	(b)	Output File Dump for Creation
	3.(c)	Plus
6	1.(a)	Plus
	(b)	Overall Duration of Monthly flows
	(c)	Flow Duration by Months
	(d)	Flow Duration for Tourist Season
	(e)	Flow Duration for Non-Tourist Season
7	1.(a)	Plus
	(b)	Lake Erie Elevation Duration by Months
	(c)	Overall Elevation Duration
	(d)	Navigation Season Elevation Duration

TABLE 10 NIAGARA RIVER PLANTS - BATCH MODE RUNSTREAM EXAMPLE

```
@RUN,U/RPS XLERIE,AN9998/GWTP,HSTG4,10,300
@ASG,S  PROG.,U9S,31682
@ASG,S  DATA.,U9S,47195
@ASG,TJ OLDMASTER.,U9V,64523
@ASG,TJ NEWMASTER.,U9V
@ASG,TJ PRINTAPE.,U9V
@ASG,T  NIAG1.
@MOVE  PROG.,1
@COPY,G PROG.,NIAG1.
@ASG,T INPUT.
@ASG,T ONTLEVELS.
@MOVE  DATA.,20
@COPY,G DATA.,INPUT.
@COPY,G  DATA.,ONTLEVELS.
@FREE  PROG.
@FREE  DATA.
@USE   8.,OLDMASTER.
@USE   9.,NEWMASTER.
@USE 10.,ONTLEVELS.
@BRKPT PRINT$/PRINTAPE
@XQT   NIAG1.LOAD
@ADD   INPUT.
@BRKPT PRINT$
@PRINT PRINTAPE.
@MSG PLEASE PRINT TAPE "PRINTAPE" ON 11X15 PAPER
@FIN
```

general purpose card punching form

system: TABLE 11 - ST. LAWRENCE RIVER PLANTS - DATA FORMAT

program:

programmer: date:

punching instructions: written as / punch as

punch code: ☐ IBM 360 ☒ univac 1108 ☐

sheet: of

field identification

1 2 11 16 21 31 41 51 61 71 72 80

HEADING

FLOW ADJUSTMENT ±XXXXX CFS

LAKE LEVEL ADJUSTMENT ±XXX.XX FT.

LAKE ONTARIO FLOWS AND LEVELS (LAKE LEVELS READ AS XXX.XX)

	LEVEL	FLOW	LEVEL	FLOW	LEVEL	FLOW	LEVEL	FLOW	LEVEL	FLOW	LEVEL	FLOW	LEVEL	FLOW
	FT.	CFS/10												
	JAN		FEB		MAR		APR 1-15		APR 16-30		MAY		JUNE	

	LEVEL	FLOW	LEVEL	FLOW	LEVEL	FLOW	LEVEL	FLOW	LEVEL	FLOW	LEVEL	FLOW	LEVEL	FLOW
	JULY		AUG		SEPT		OCT		NOV		DEC 1-15		DEC 16-31	

57477 rev. 8-67

general purpose card punching form

system	punching instructions	punch code	sheet
TABLE 12 - ST. LAWRENCE RIVER PLANTS - DATA EXAMPLE *	written as	IBM 360	
program		X univac 1108	of
programmer / date	punch as		

field identification

```
1552-CAT 2
   +0   +0
190001   24335210002431621000243312070024397214002442319200244761980024511217 00
190008   24551220002456224700245162660024463263002441525900244092610024424244 00
190101   24338212002430220700242892040024345188002441319200244672040024497209 0C
190108   24507216002450022000244892250024471251002446526500244582760024435250 00
9999
```

* THIS DATA IS A SAMPLE ONLY - IT HAS NO RELATION TO THE ACTUAL DATA USED IN THE STUDY

TABLE 13 ST. LAWRENCE RIVER PLANTS - BATCH MODE RUNSTREAM EXAMPLE

```
@RUN,U/RPS XLERIE,AN9998/GWTP,HSTG4,10,300
@ASG,S  PROG.,U9S,31682
@ASG,TJ OLDMASTER.,U9V,22321
@ASG,TJ NEWMASTER.,U9V
@ASG,TJ PRINTAPE.,U9V
@ASG,S  DATA.,U9S,47195
@ASG,T  STLPRG.
@MOVE  PROG.,2
@COPY,G PROG.,STLPRG.
@ASG,T  INPUT.
@MOVE  DATA.,14
@COPY,G DATA.,INPUT.
@FREE  PROG.
@FREE  DATA.
@USE   8.,OLDMASTER.
@USE   9.,NEWMASTER.
@BRKPT PRINT$/PRINTAPE
@XQT   STLPRG.XQT
@ADD   INPUT.
@BRKPT PRINT$
@PRINT PRINTAPE.
@MSG PLEASE PRINT TAPE "PRINTAPE" ON 11X15 PAPER
@FIN
```

general purpose card punching form

system

TABLE 14 - SUMMARY PROGRAMME - DATA FORMAT

program

programmer | date

punching instructions

written as

punch as

punch code

IBM 360

X univac 1108

sheet

of

field identification

1 2 11 16 21 31 41 51 61 71 72 80

1 DATA CARD REQUIRED TO SPECIFY EACH REPORT REQUESTED :

HEADING | CODE | YYYY | YYYY

START YEAR

FINAL YEAR

CODE DEFINING TYPE OF REPORT REQUESTED :

HEADING USED TO IDENTIFY DATA ON THE INPUT MASTER TAPE . MUST MATCH THE HEADING SPECIFIED IN THE ST. MARYS, NIAGARA, AND ST. LAWRENCE PROGRAMMES WHICH CALCULATED THE SUMMARY INPUT DATA.

PK2 COMBINED PEAK OUTPUTS OF SAUNDERS AND ST. MARYS ONLY

PK3 COMBINED PEAK OUTPUTS OF SAUNDERS, NIAGARA, AND ST. MARYS

AVMW AVERAGE MONTHLY OUTPUT AND ANNUAL OUTPUT OF SAUNDERS, NIAGARA AND ST. MARYS

9999 (SENTINEL CARD - PLACED AFTER LAST DATA CARD)

general purpose card punching form

system	punching instructions	punch code	sheet
TABLE 15 - SUMMARY PROGRAMME - DATA EXAMPLE *	written as	☐ IBM 360	of
program	punch as	☒ univac 1108	
programmer / date		☐	

field identification

1 2 11 16 21 31 41 51 61 71 72 80

[illegible]-CAT [illegible] [illegible]

[illegible]-CAT 2 [illegible]

9999

* THIS DATA IS A SAMPLE ONLY - IT HAS NO RELATION TO THE ACTUAL DATA USED IN THE STUDY

57477 rev. 6-67

TABLE 16 SUMMARY PROGRAMME - BATCH MODE RUNSTREAM EXAMPLE

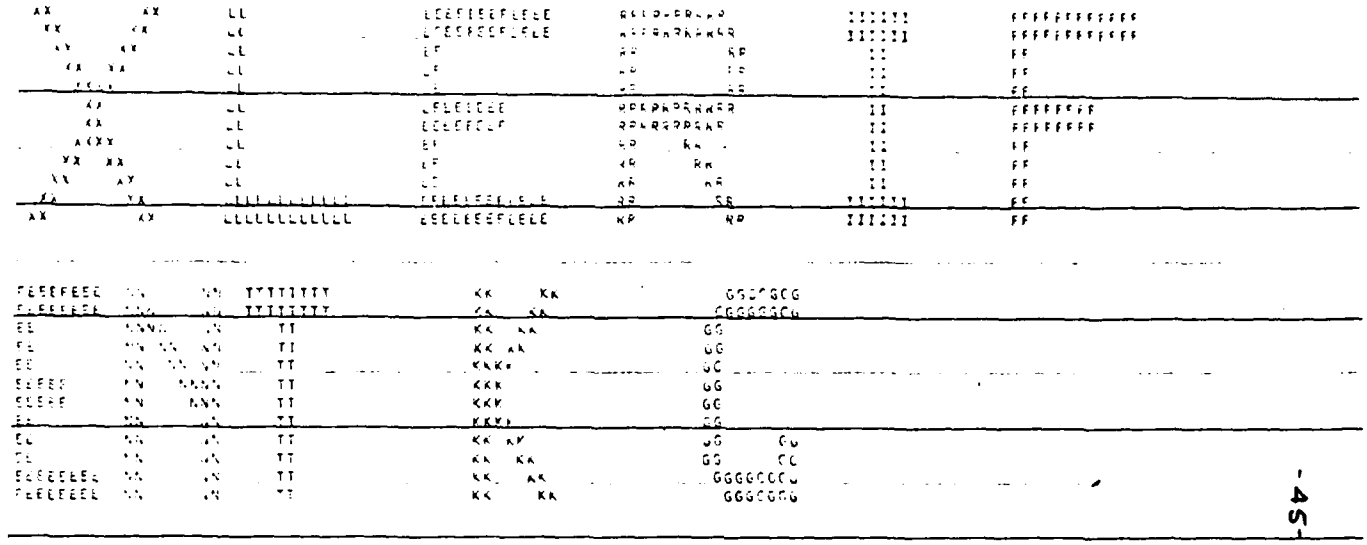
```
@RUN,U/RPS XLERIE,AN9998/GWTP,HSTG4,10,300
@ASG,S  PROG.,U9S,31682
@ASG,TJ OLDMASTER.,U9V,98374
@ASG,TJ PRINTAPE.,U9V
@USE    8.,OLDMASTER.
@MOVE   PROG.,3
@ASG,T SUMMARY.
@COPY,G PROG.,SUMMARY.
@FREE   PROG.
@BRKPT PRINT$/PRINTAPE
@XQT    SUMMARY.XQT
(SEE TABLE 15 FOR DATA EXAMPLE)
@BRKPT PRINT$
@FREE OLDMASTER.
@PRINT PRINTAPE.
@MSG PLEASE PRINT TAPE "PRINTAPE" ON 11X15 PAPER
@FIN
```

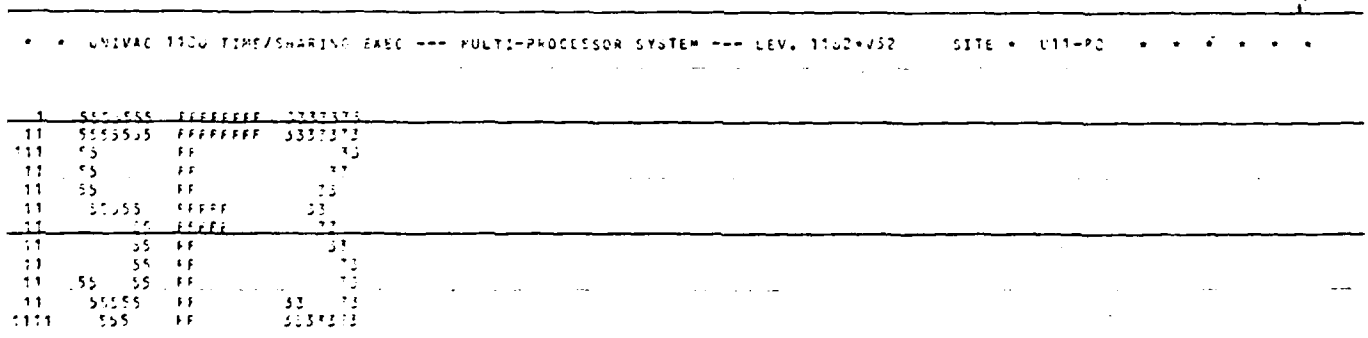
SECTION 3.0

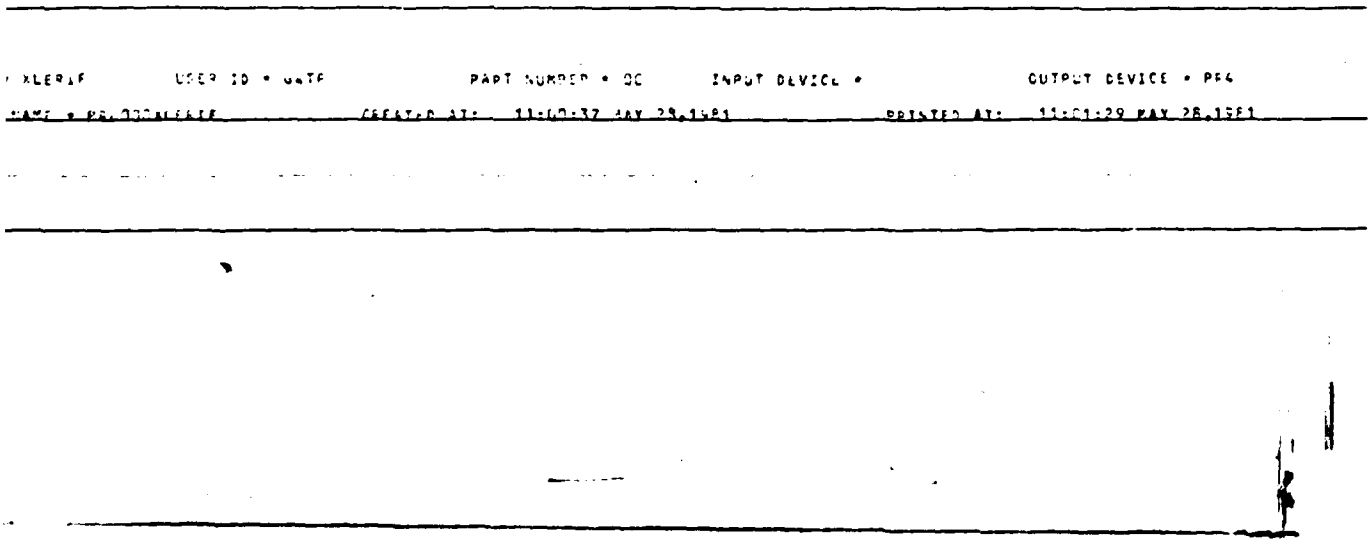
PROGRAM LISTINGS

The programs listed here are:

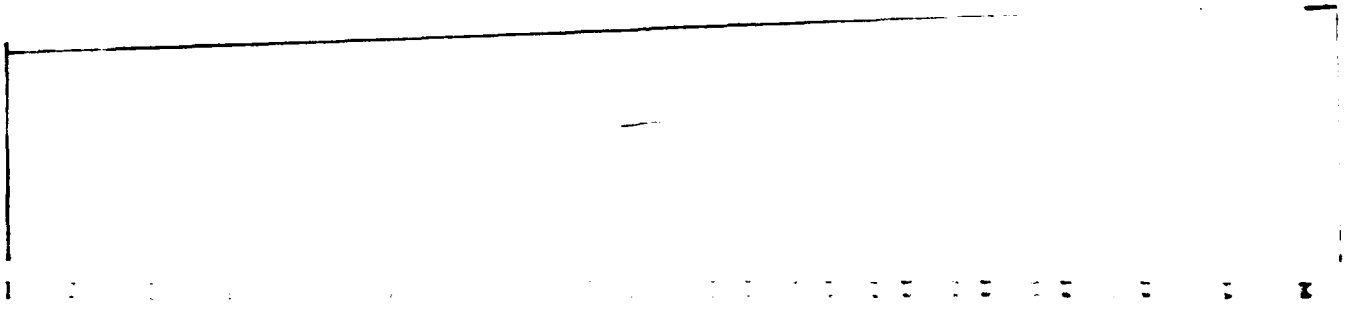
St. Marys	STMARY
Niagara	NIAG1
Niagara 6 and 9	NIAG2
Niagara 12 and 13	NIAG3
St. Lawrence	STLPRG
St. Lawrence Category 3	STLPRG3
Summary	SUMMARY



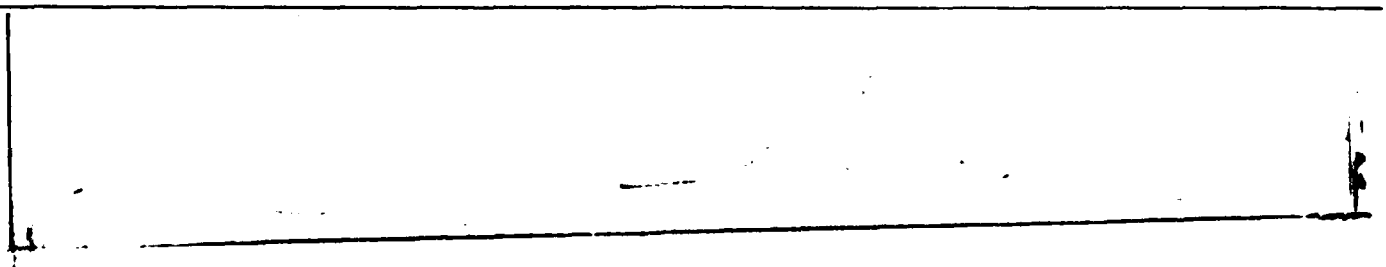




```
@RUN,P      XLERIE,AN9720/GWTP,HSTG4,10,500

@LOG SEND OUTPUT TO DENT-H15F3

@ASG,A STMARY.
FAC WARNING        C40000100000
```



```
:SSG,IKE  ,HSTG4*STMARY./I
SSG 15R1-H2 73R1H3 05/28/81 11:00:47
```

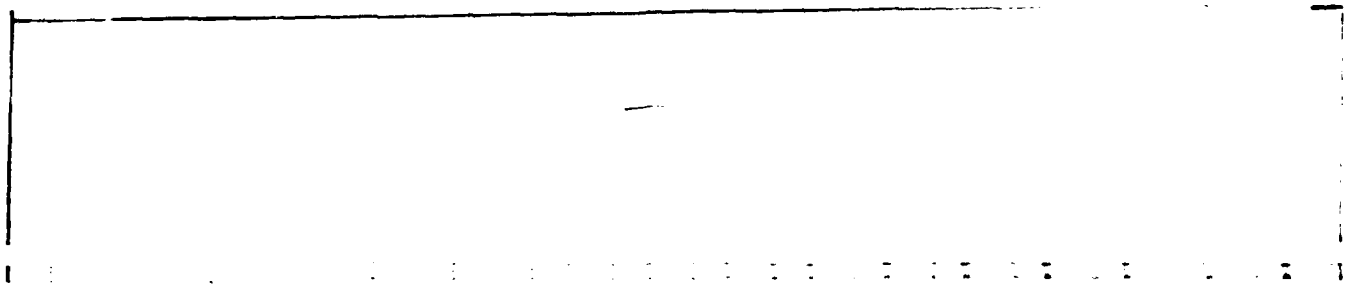



SSG STREAM GENERATION STATEMENTS

2	SUBMAXOUT	5
2	SUBMAXOUT	1, 1
2	MWLXD1	1, 4
2	MWLXE1	1, 4
2	MWLXA1	5
2	MWLXD1	5
2	MWLXE1	5
2	MWLXM1	1, 4
2	MSCIM1	5
2	DATA	1, 1
2	MWLXL1	5
2	MWLXB1	5
2	MWLXC1	5
2	MWLXM2	5
2	MWLXM1	5
2	SUBGLP	1, 1
2	SUBGLP	5
2	MWLXA1	1, 4
2	MWLXL1	1, 4
2	MWLXB1	1, 4
2	MWLXC1	1, 4
2	MWLXM1	1, 4
2	MAP	1, 1
2	XGT	6
2	MWLXM2	1, 1

```
SSS   REVISED   SKELLTON

0001  00    *INCREMENT A FROM 1 BY 1 TO [Z]
0002  01      *IF [Z,A,2,1] <=
0003  02        #MDG  ****** [Z,A,1,13/[Z,*,*,*,1] ******
0004  02        #PRT,S, MSTC=*STMARY.[Z,A,1,13/[Z,A,2,1]
0005  01      *END
0006  00    *LOOP
```

```
SSG   GENERATED OUTPUT STREAM        PART 1

000001              @HDC  ****** SUBMAXOUT/              ******
000002              @PRT,S  HSTG4*STMARY.SUBMAXOUT/
000003              @HDG  ****** MWLXD1/              ******
000004              @PRT,S  HSTG4*STMARY.MWLXD1/
000005              @HDG  ****** MWLXE1/              ******
000006              @PRT,S  HSTG4*STMARY.MWLXE1/
000007              @HDG  ****** MSD1M1/              ******
000008              @PRT,S  HSTG4*STMARY.MSD1M1/
000009              @HDG  ****** DATA/              ******
000010              @PRT,S  HSTG4*STMARY.DATA/
000011              @HDG  ****** SUBGLP/              ******
000012              @PRT,S  HSTG4*STMARY.SUBGLP/
000013              @HDG  ****** MWLXA1/              ******
000014              @PRT,S  HSTG4*STMARY.MWLXA1/
000015              @HDG  ****** MWLXL1/              ******
000016              @PRT,S  HSTG4*STMARY.MWLXL1/
000017              @HDG  ****** MWLXB1/              ******
000018              @PRT,S  HSTG4*STMARY.MWLXB1/
000019              @HDG  ****** MWLXC1/              ******
000020              @PRT,S  HSTG4*STMARY.MWLXC1/
000021              @HDG  ****** MWLXW1/              ******
000022              @PRT,S  HSTG4*STMARY.MWLXW1/
000023              @HDG  ****** MAP/              ******
000024              @PRT,S  HSTG4*STMARY.MAP/
000025              @HDG  ****** MWLXM2/              ******
000026              @PRT,S  HSTG4*STMARY.MWLXM2/

END SSG     TIME =  00:00:11  HIGHEST ADDRESS =  0061552  OCTAL

@HDC  ****** SUBMAXOUT/              ******

@PRT,S  HSTG4*STMARY.SUBMAXOUT/
FURPUP 28R1.H2.6 E35 S74T11 05/28/81 11:00:58
```




```
HSTG4*STMARY(1).SUBMAXOUT(2)
                SUBROUTINE MAXOUT(QC,QMAX,EL011,EL012,HH,FH,FT)
                I=0
                HH=0
        10      IF(ABS(QC-QMAX).LE.100.)RETURN
                I=I+1
                IF(I.GE.100)GO TO 30
                QC=0.5*(QC+QMAX)
                CALL CLC(EL011,EL012,QC,FH,FT)
                HH=FH-FT
                QMAX=SQRT(HH/19.69)*37310
                GO TO 10
        30      WRITE(6,40)QC,QMAX
        40      FORMAT(10X,45HITERATION NOT COMPLETED, FINAL VALUE OF QC = ,
               1F8.0,8HQTEST = ,F8.0)
                CALL LINECT
                RETURN
                END

HUDC ****** MWLXD1/ ******

@PRT,S HSTG4*STMARY.MWLXD1/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 11:00:58
```

```
****** MLXD1/                    ******                                    DATE 052881      PAGE    7
HSTG4*STMARY(1),MLXD1(1)
      1          SUBROUTINE DURAT (IYEAR1,INDEX)                                          WLW00010
      2      C                                                                            WLW00020
      3      C              THE SUBROUTINE PRODUCES THE DURATION CURVES                   WLW00030
      4      C                  (1) FOR EACH MONTH FOR                                    WLW00040
      5      C                          - LAKE SUPERIOR LEVEL (A(12,100,1))               WLW00050
      6      C                          - LAKE SUPERIOR FLOW  (A(12,100,2))               WLW00060
      7      C                          - LAKE HURON LEVEL    (A(12,100,3))               WLW00070
      8      C                          - TOTAL PLANT OUTPUT (OUT(12,100))
      9      C                  (2) FOR WHOLE PERIOD FOR PLANT OUTPUT                     WLW00090
     10      C                                                                            WLW00100
     11      C          INPUT : IYEAR1 - THE BEGINNING YEAR                               WLW00110
     12      C                  INDEX - THE NUMBER OF YEARS                               WLW00120
     13      C                                                                            WLW00130
     14      C          SUBROUTINE USED :                                                 WLW00140
     15      C                  DURC(TITLE,TITLE1,B,M,INDEX,NUM)                          WLW00150
     16      C                                                                            WLW00160
     17            COMMON/CONE/IFIRST
     18            COMMON /COM1/A(12,100,3), OUT(12,100),FOREGL(12,100),TAILGL(12,100
     19           1), OUTT(12,100)
     20            DIMENSION B(2,100),TITLE(2,2),TITLE1(2,10),TITLE2(2),TITLE3(3),
     21           1TITLE4(2),M(2,100),KRS(12)
     22            EQUIVALENCE (B(1),A(1))                                              WLW00210
     23            DATA  TITLE/4H LAK,4HE SU,4HP LE,4HVELS,4H (FT,4H)  F,2HOR,4HLAKE,   WLW00220
     24           1,4H SUP,4H OUT,4HFLOW,4HS(CF,4HS) F,2HOR,4H LAK,4HE HU,4HR LE,4HVEL,4WLW00230
     25           2,4H (FT,4H)  F,2HOR/                                                 WLW00240
     26           3TITLE1/4HJAN ,4HFEB ,1H ,4HMARCH,4HAPRI,1H ,4HMAYC,4HM   ,1H ,4HJUNWLW00250
     27           4E ,4HL   ,1H ,4HMAY ,4H    ,1H ,4HJUNE,4H    ,1H ,4HJULY,4H    ,1H WLW00260
     28           5,4HAUGU,4HST  ,1H ,4HSEPT,4HEMBE,1HP,4HOCTO,4HBER ,1H ,4HNOVE,4HMBRWLW00270
     29           6ER,1H ,4HDECE,4HMBER,1H /
     30            DATA  TITLE2/4HST A,4HAGES,4H K C,4HUTPU,4HT (M,4HW) F,2HOR/
     31           1    TITLE3/4HLAKE,4HE YE,2HAR/                                       WLW00300
     32           2      TITLE4/4HST A,4HAGES,4H K C,4HUTPU,4HT(M,4HW) F,2HOR/
     33            DATA KRS/744,673,744,720  ,744,720,2*744,720,744,720,744     /      WLW00320
     34      C                                                                          WLW00330
     35      C              PROGRAM BEGINS                                              WLW00340
     36      C                                                                          WLW00350
     37            IYEAR1=IYEAR1-1                                                    WLW00360
     38            IFIRST = IYEAR1
     39            DO 11 K=1,3                                                        WLW00370
     40      C                                                                        WLW00380
     41      C              FOR EACH MONTH PRODUCE THE DURATION CURVES FOR THE        WLW00390
     42      C              LAKE SUPERIOR LEVEL(K=1),LAKE SUPERIOR OUTFLOW(K=2),AND   WLW00400
     43      C              LAKE HURON LEVEL(K=3)                                     WLW00410
     44      C                                                                        WLW00420
     45            DO 16 I=1,12                                                       WLW00430
     46      C                                                                        WLW00440
     47      C              PRODUCE DURATION CURVES FOR ONE MONTH                     WLW00450
     48      C                                                                        WLW00460
     49      C                                                                        WLW00470
     50      C              MOVE DATA AND YEARS TO ARRAY B                            WLW00480
     51      C                                                                        WLW00490
     52            DO 10 J=1,INDEX                                                    WLW00500
     53            B(1,J)=A(I,J,K)                                                    WLW00510
     54         10 B(2,J)=IYEAR1+J                                                    WLW00520
     55      C                                                                        WLW00530
     56      C              CALL SUBROUTINE TO PRODUCE DURATION CURVE                 WLW00540
```

```
****** MULXD1/            ******                                    DATE 052*81      PAGE     8

     C
   16 CALL DURC(TITLE(1,K),TITLE1(1,1),F,M,INDEX,K)                 WLWD0550
   11 CONTINUE                                                      WLWD0560
      DO 13 I=1,12                                                  WLWD0570
     C                                                              WLWD0580
     C          FOR A GIVEN MONTH PRODUCE THE DURATION CURVE FOR PLANT WLWD0590
     C          OUTPUT                                              WLWD0600
     C                                                              WLWD0610
     C          MOVE PLANT OUTPUTS AND YEARS TO ARRAY B             WLWD0620
     C                                                              WLWD0630
      DO 12 J=1,INDEX                                               WLWD0640
      B(1,J) = OUT(I,J)                                             WLWD0650
   12 B(2,J)=IYEAR1+J                                               WLWD0660
     C                                                              WLWD0670
     C          CALL SUBROUTINE TO PRODUCE DURATION CURVE           WLWD0680
     C                                                              WLWD0690
      CALL DURC(TITLE2,TITLE1(1,1),B,M,INDEX,4)                     WLWD0700
   13 CONTINUE                                                      WLWD0710
     C                                                              WLWD0720
     C          PRODUCE DURATION CURVE FOR PLANT OUTPUT FOR WHOLE PERIOD WLWD0730
     C                                                              WLWD0740
     C          MOVE PLANT OUTPUTS AND YEARS TO ARRAY B             WLWD0750
     C                                                              WLWD0760
      DO 15 J=1,INDEX                                               WLWD0770
      IYEAR=IYEAR1+J                                                WLWD0780
      HRS(2)= (24+LEAP(IYEAR))*24                                   WLWD0790
      SUM = 0.0                                                     WLWD0800
      DO 14 I=1,12                                                  WLWD0810
      HRS = HRS(I)                                                  WLWD0820
   14 SUM = SUM + OUT(I,J)*HRS                                      WLWD0830
      B(1,J) = SUM                                                  WLWD0840
   15 B(2,J)=IYEAR                                                  WLWD0850
     C                                                              WLWD0860
     C          CALL SUBROUTINE TO PRODUCE DURATION CURVE           WLWD0870
     C                                                              WLWD0880
      CALL DURC(TITLE4,TITLE3,B,M,INDEX,4)                          WLWD0890
      RETURN                                                        WLWD0900
      END                                                           WLWD0910

$HDG  ****** MULXE1/            ******

$PRT,S  HST64*STMARY,MULXE1/
FURPUR 2R#1,H2,S F35 574T11 05/28/81 11:00:59
```

```
HSTG4*STMARY(1).MWLXE1(1)
      SUBROUTINE DURC(TITLE,TITLE1,P,M,INDEX,NUM)                       WLXE0010
C                                                                       WLXE0020
C             THIS SUBROUTINE PRODUCES A DURATION REPORT CONTAINING     WLXE0030
C                     -DATE                                             WLXE0040
C                     -VALUE                                            WLXE0050
C                     -ACCUMULATED TOTAL                                WLXE0060
C                     -PERCENTAGE                                       WLXE0070
C                     -AVERAGE VALUE                                    WLXE0080
C                                                                       WLXE0090
C             INPUT- TITLE - 7 WORD TITLE AT TOP OF EACH PAGE           WLXE0100
C                  - TITLE1- 3 WORD SUBTITLE APPENDED TO TITLE          WLXE0110
C                  - B(2,1200) - ARRAY OF REAL VALUES AND DATES         WLXE0120
C                  - M(2,1200) - ARRAY OF INTEGER VALUES AND DATES      WLXE0130
C                  - INDEX - NUMBER OF VALUES IN B OR M                 WLXE0140
C                  - NUM - 2 IF INPUT IS INTEGER                        WLXE0150
C                                                                       WLXE0160
      DIMENSION B(2,100),M(2,100),TITLE(7),TITLE1(3)
      COMMON/COM3/IHDG(4)                                               WLXE0175
      COMMON/COM6/IYEAR1
C                                                                       WLXE0180
C             SET INITIAL VALUES                                        WLXE0190
C                                                                       WLXE0200
      LINE=60                                                           WLXE0210
      SUM=0.                                                            WLXE0230
      ISUM=0                                                            WLXE0240
      IFIRST = IYEAR1+1
      ILAST = IYEAR1+INDEX
C                                                                       WLXE0250
C             SORT VALUES IN M(2,INDEX) IN DESCENDING ORDER             WLXE0260
C                                                                       WLXE0270
      INDI=INDEX-1                                                      WLXE0280
      DO 9 I=1,INDI                                                     WLXE0290
      INDJ=I+1                                                          WLXE0300
      DO 8 J=INDJ,INDEX                                                 WLXE0310
      IF (M(1,I)-M(1,J))6,7,8                                           WLXE0320
    7 IF (M(2,I).LE.M(2,J))GO TO 8                                      WLXE0325
    6 M1=M(1,I)                                                         WLXE0330
      M2=M(2,I)                                                         WLXE0340
      M(1,I)=M(1,J)                                                     WLXE0350
      M(2,I)=M(2,J)                                                     WLXE0360
      M(1,J)=M1                                                         WLXE0370
      M(2,J)=M2                                                         WLXE0380
    8 CONTINUE                                                          WLXE0390
    9 CONTINUE                                                          WLXE0400
      DO 10 I=1,INDEX                                                   WLXE0410
C                                                                       WLXE0420
C             CALCULATE ACCUMULATED TOTAL AND PERCENTAGE AND WRITE LINEWLXE0430
C             OF OUTPUT                                                 WLXE0440
C                                                                       WLXE0450
      LINE=LINE+1                                                       WLXE0460
      IF (LINE.LE.53)GO TO 5                                            WLXE 470
C                                                                       WLXE0480
C             COMMENCE A NEW PAGE -WRITE TITLES                         WLXE0490
C                                                                       WLXE0500
      LINE=7                                                            WLXE0510
      WRITE(6,200) IHDG,IFIRST,ILAST
```

```
  200 FORMAT (1H1,34X,61HEVALUATION OF REGULATIONS FOR GREAT LAKES LEVELWLXE0540
     1S AND OUTFLOWS,16X,4A4 /,50X,31H  ST MARYS RIVER POWER PLANTS  30X
     2,3X,1H-,14/)
      WRITE (6,201)(TITLE(J),J=1,7),(TITLE1(J),J=1,3)                  WLXE0560
  201 FORMAT (30X,21HDURATION LISTING FOR ,10A4/)
      WRITE (6,202)                                                    WLXE0580
  202 FORMAT (23X,4HYEAR,20X,5HVALUE,15X,17HACCUMULATED VALUE,11X,10HPERWLXE0590
     1CENTAGE/)                                                        WLXE0600
    5 X=1                                                              WLXE0610
      Y=INDEX                                                          WLXE0620
      PERC=(2.*X-1.)/Y*50.                                             WLXE0630
      IF (NUM.EQ.2)GO TO 2                                             WLXE0640
C                                                                      WLXE0650
C              INPUT VALUES ARE REAL                                   WLXE0660
C                                                                      WLXE0670
    1 SUM=SUM+B(1,I)                                                   WLXE0680
      IF(NUM.EQ.4) GO TO 40
      WRITE (6,101)M(2,I),B(1,I),SUM,PERC                              WLXE0690
  101 FORMAT (23X,I4,17X,F8.2,15X,F9.2,17X,F6.2)                       WLXE0700
      GO TO 10                                                         WLXE0710
   40 WRITE(6,105) M(2,I),B(1,I),SUM,PERC
  105 FORMAT (23X,I4,17X,F8.1,17X,F10.1,17X,F6.2)
      GO TO 10
C              INPUT VALUES ARE INTEGER                                WLXE0720
C                                                                      WLXE0730
C                                                                      WLXE0740
    2 ISUM=ISUM+M(1,I)                                                 WLXE0750
      WRITE (6,102)M(2,I),M(1,I),ISUM,PERC                             WLXE0760
  102 FORMAT (23X,I4,17X,I8,17X,I10,17X,F6.2)                          WLXE0770
   10 CONTINUE                                                         WLXE0780
C                                                                      WLXE0790
C              WRITE AVERAGE VALUE AT END OF REPORT                    WLXE0800
C                                                                      WLXE0810
      IF (NUM.EQ.2)GO TO 4                                             WLXE0820
    3 SIND=INDEX                                                       WLXE0830
      SUM=SUM/SIND                                                     WLXE0840
      IF(NUM.EQ.4) WRITE(6,106) SUM
  106 FORMAT(1H+,105X,15HAVERAGE VALUE  ,F8.1)
      IF(NUM.EQ.4) WRITE(6,103) SUM
  103 FORMAT (1H+,105X,15HAVERAGE VALUE  ,F8.2)                        WLXE0860
      RETURN                                                           WLXE0870
    4 ISUM=(ISUM+INDEX/2)/INDEX                                        WLXE0880
      WRITE (6,104)ISUM                                                WLXE0890
  104 FORMAT (1H+,105X,14HAVERAGE VALUE ,I9)                           WLXE0900
      RETURN                                                           WLXE0910
      END                                                              WLXE0920
```

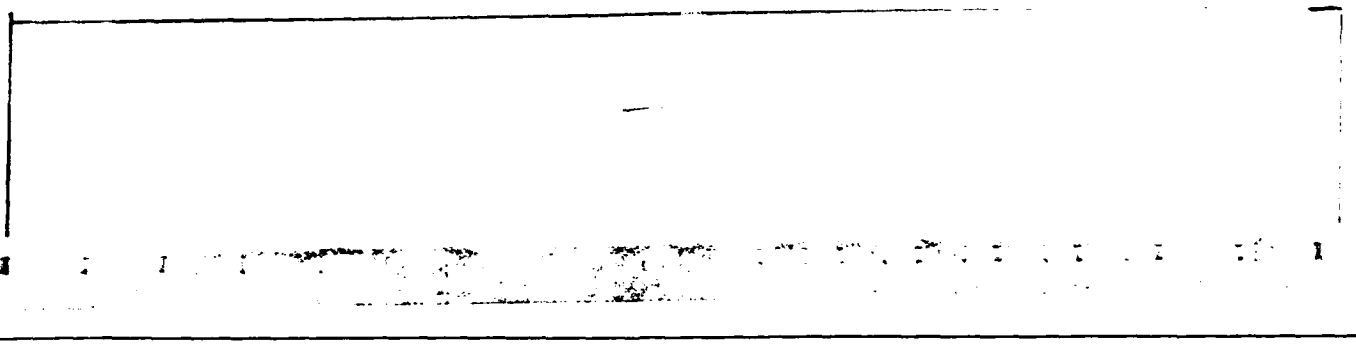
@HDG ****** M3D1M1/ ******

```
@PRT,S  HSTG4*STMARY.M3D1M1/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 11:01:00
```

+55-

```
HSTG4*STMARY(1).M3D1M1(1)
      C
            FUNCTION LEAP(IYEAR)                                        3D100010
      C (UNIVAC 1100 - FORTRAN V)                                       3D100015
      C
      C FUNCTION LEAP EXAMINES THE INPUT YEAR TO DETERMINE WHETHER IT IS A   3D100020
      C LEAP YEAR. WHEN THE INPUT YEAR IS A LEAP YEAR A FLAG IS SET TO 1. IF 3D100030
      C IT IS NOT A LEAP YEAR THIS FLAG IS SET TO 0.                    3D100040
      C
            ALPHA = IYEAR                                               3D100050
            BETA = ALPHA / 4.0                                          3D100060
            LAMBDA = IYEAR / 4                                          3D100070
            GAMMA = LAMBDA                                              3D100080
      C
            IF (BETA.EQ.GAMMA) GO TO 200                                3D100090
      C
        100 LEAP = 0                                                    3D100100
            GO TO 400                                                   3D100110
      C
        200 IF (IYEAR.EQ.1900) GO TO 100                                3D100120
      C
        300 LEAP = 1                                                    3D100130
      C
        400 RETURN                                                      3D100140
      C
            END                                                         3D100150
```

```
$HDG  ****** DATA/          ******

@PRT,S  HSTG4*STMARY.DATA/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 11:01:01
```



```
****** DATA/                ******                                                    DATE 052851        PAGE    12

HSTG4*STMARY(1).DATA(0)
     1        TEST DATA
     2        1965       57827578275782757827578275782757827578275782757827578275782757827
     3        1966       57827578275782757827578275782757827578275782757827578275782757827
     4        9999
     5        196501     60200 400060200 500060200 600060200 700060200 800060200 9000
     6        196507     60200100006020011000602001200060200130006020014000602001500 0
     7        196601     59800 400059800 500059800 600059800 700059800 800059800 9000
     8        196607     59800100005980011000598001200059800130005980014000598001500 0
     9        9999

CHDG  ****** SUBGLP/              ******

@PRT,S  HSTG4*STMARY.SUBGLP/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 11:01:02
```

```
HSTG4*STMARY(1).SUBGLP(6)
      SUBROUTINE GLP(EL011,EL012,QC,FH,FT)
C     RELATIONSHIP FOR HEADWATER FH AND TAILWATER FT
C     LEVELS SUPPLIED BY ACRES CONSULTING INC. FOR NEW
C     ST. MARYS GENERATING STATION
      IF(EL011.GE.574.147)GO TO 10
      WRITE(6,205)EL011
      EL011=547.147
      CALL LINECT
205   FORMAT(10X,17HGAUGE 11 LEVEL IS,F6.2,11HFT. - VALUE,
     145H IS TOO LOW. IT HAS BEEN RESET TO 574.147 FT.)
10    FH=EL011-(0.0211*QC**2.2626)/(EL011-574.147)**6.06
      IF(EL012.LE.590.551)GO TO 20
      WRITE(6,204)EL012
      EL012=590.551
      CALL LINECT
204   FORMAT(10X,17HGAUGE 12 LEVEL IS,F6.2,5HFT. -,
     152H VALUE IS TOO HIGH. IT HAS BEEN RESET TO 590.551 FT.)
20    FT=EL012+1.2394E-11*QC**2*(590.551-EL012)**1.39
      RETURN
      END

EHDG ****** MWLXA1/ ******

$PRT.S HSTG4*STMARY.MWLXA1/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 11:01:03
```

-58-

```
MWLXA*(2)
  REAL FUNCTION CALC(APPROX,HEIGHT,Q,C1,C2)                    WLXA0010
  ITERATION SUBROUTINE TO DETERMINE FLOW FROM UNIT FALL RELATIONSHIP
  USED FOR BOTH OPEN WATER AND ICE COVER
  A = -1.0                                                     WLXA0020
  IF(APPROX.GT.HEIGHT) A = 1.0                                 WLXA0030
  I = 0                                                        WLXA0050
5 BEFORE = APPROX
  I = I+1
  APPROX = HEIGHT + A*(((C1*Q)/(APPROX + HEIGHT - C2))**2
  IF(ABS(APPROX-BEFORE).LT..001 )GO TO 20                      WLXA0090
  IF(I.GT.50) GO TO 10                                         WLXA0070
  GO TO 5                                                      WLXA0110
0 WRITE(6,15) APPROX , BEFORE                                  WLXA0120
  CALL EXIT                                                    WLXA0130
5 FORMAT (10X, 32HITERATIONS EXCEED 50, VALUES ARE , 2F7.2)    WLXA0140
0 CALC = APPROX                                                WLXA0150
  RETURN                                                       WLXA0160
  END                                                          WLXA0170
```

XL1/ ******

MARY.MWLXL1/
E35 S74711 05/28/81 11:01:04

```
HSTG4*STMARY(1).MWLXL1(11)
      SUBROUTINE LINECT
C     LINE COUNTING AND TITLING SUBROUTINE
      COMMON /COM3/IHDG(4)
      COMMON LINE
      IF (LINE.LT.45)GO TO 1
      WRITE(6,100) IHDG
      LINE=0
    1 LINE=LINE+1
      RETURN
  100 FORMAT(1H1,30X,'EVALUATION OF REGULATIONS FOR GREAT LAKES '
     1 'LEVELS AND OUTFLOWS',16X,4A4,
     2/,47X,'  ST MARYS RIVER POWER PLANTS',//,
     14X,'DATE',6X,'L.SUPERIOR',3X,'L.SUPERIOR',3X,'LAKE HURON',
     14X,'@ CANADA',5X,'@ CANADA',3X,'GREAT LAKES',2X,'GREAT LAKES',
     12X,'GREAT LAKES',1X,'GREAT LAKES',/,16X,'LEVEL',7X,'OUTFLOW',
     17X,'LEVEL',9X,' SHARE ',6X,'USEABLE ',4X,'HEADWATER',
     14X,'TAILWATER',4X,'HEAD',7X,'OUTPUT',/,16X,'(FT)',9X,
     1'(CFS)',8X,'(FT)',10X,'(CFS)',8X,'(CFS)',7X,'(FT)',9X,'(FT)',
     19X,'(FT)',8X,'(MW)')
      END

IHDG ****** MWLXB1/ ******

IPRT.S HSTG4*STMARY.MWLXB1/
FURPUR 2GR1.H2.6 E35 S74T11 05/28/81 11:01:11
```

-60-

```
HSTG4*STMARY(1).MWLXB1(3)
      SUBROUTINE CARDP(IND)                                          WLXB0010
C     SUBROUTINE READS, CHECKS, AND STORES LAKE HURON LEVEL DATA
      DIMENSION XLEVEL(12)                                           WLXB0020
      COMMON/COM1/DUM1(2400),HURLEV(12,100),DUM2(4800)               WLXB0030
     1      /COM4/IYR1,JYR                                           WLXB0032
  200 IF(IND.GT.100)RETURN                                           WLXB0040
      IND = IND+1                                                    WLXB0050
      READ (5,205)IYR,XLEVEL                                         WLXB0060
  205 FORMAT (I4,6X,12F5.2)                                          WLXB0070
      IF(IYR.EQ.9999)RETURN                                          WLXB0080
      IF(IND.EQ.1)JYR = IYR-1                                        WLXB0090
      IF(IND.EQ.1)IYR1 = IYR                                         WLXB0100
      JYR = JYR+1                                                    WLXB0110
      IF(IYR.GT.1976)GO TO 230                                       WLXB0120
      IF(IYR.LT.JYR) GO TO 220                                       WLXB0130
      IF(IYR.GT.JYR) GO TO 240                                       WLXB0140
  210 DO 215 J = 1,12                                                WLXB0150
  215 HURLEV(J,IND) = XLEVEL(J)                                      WLXB0160
      GO TO 200                                                      WLXB0170
  220 WRITE(6,225)JYR,IYR                                            WLXB0180
  225 FORMAT (10X,59HWRONG YEAR FOUND IN LAKE HURON LEVEL DATA, YEAR EXPWLXB0190
     1ECTED IS, I5,15H, YEAR FOUND IS, I5,17H, CARD IS IGNORED)      WLXB0200
      CALL LINECT                                                    WLXB0210
      GO TO 200                                                      WLXB0220
  230 WRITE(6,235)IYR                                                WLXB0230
  235 FORMAT (10X,7HYEAR IS, I5,1X, 24HIN LAKE HURON LEVEL DATA,23H- CARWLXB0240
     1D IS BEING IGNORED)                                            WLXB0250
      CALL LINECT                                                    WLXB0260
      JYR = JYR - 1
      GO TO 200                                                      WLXB0270
  240 WRITE(6,245) JYR,IYR                                           WLXB0280
  245 FORMAT (10X,59HWRONG YEAR FOUND IN LAKE HURON LEVEL DATA, YEAR EXPWLXB0290
     1ECTED IS, I5,15H, YEAR FOUND IS, I5, 36H, LAKE HURON LEVELS HAVE BWLXB0300
     2EEN ZEROED)                                                    WLXB0310
      K = IND                                                        WLXB0320
      IND = IND+IYR-JYR                                              WLXB0330
      L = IND-1                                                      WLXB0340
      DO 260 I = K,L                                                 WLXB0350
      DO 260 J = 1,12                                                WLXB0360
      HURLEV(J,I) = 0.0                                              WLXB0370
  260 CONTINUE                                                       WLXB0380
      JYR = IYR
      GO TO 210                                                      WLXB0390
      END                                                            WLXB0400

WHDG ****** MWLXC1/ ******

CPRT,S HSTG4*STMARY,MWLXC1/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 11:01:14
```

```
HSTG4*STMARY(1),WLXC1(4)
      1            SUBROUTINE CARDRD(INDEX)                                  WLXC0010
      2      C     SUBROUTINE READS, CHECKS AND STORES LAKE SUPERIOR INPUT DATA
      3            COMMON/COM1/SUPL(12,100),IFLOW(12,100),HUPLEV(12,100),IOUTGL(12,10
      4           10),FOREGL(12,100), TAILGL(12,100), IOUT(12,100)
      5           2      /COM2/IYEAR,JYEAR,IMONTH,JMONTH                      WLXC0040
      6            DIMENSION ALLVEL(6),OUTFL(6)                              WLXC0050
      7            REAL IOUTGL,IOUT
      8           1 READ(5,2) IYEAR,IMONTH, (XLEVEL(I),OUTFL(I),I=1,6)
      9           2 FORMAT (I4,I2,4X,6(F5.2,F5.0))                           WLXC0070
     10             IF(INDEX.NE.1) GO TO 5                                    WLXC0080
     11             JYEAR = IYEAR                                             WLXC0090
     12             JMONTH = IMONTH                                           WLXC0100
     13           5 IF(IYEAR.EQ.7999)RETURN                                   WLXC0110
     14             IF(IYEAR.LE.1989)GO TO 7                                  WLXC0120
     15             WRITE(6,6) IYEAR                                          WLXC0130
     16             CALL LINECT                                               WLXC0140
     17           6 FORMAT( 5X, 3H YEAR IS,I5,23H, CARD IS BEING IGNORED)     WLXC0150
     18             GO TO 1                                                   WLXC0160
     19           7 IF(IYEAR.EQ.JYEAR)GO TO  15                               WLXC0170
     20             WRITE(6,8)JYEAR, IYEAR                                    WLXC0180
     21             CALL LINECT                                               WLXC0190
     22           9 FORMAT( 9X,29H WRONG YEAR, YEAR EXPECTED IS,I5,15H, YEAR FOUND IS,WLXC0200
     23            * I5,39H, ZEROS ARE INSERTED FOR MISSING VALUES)           WLXC0210
     24             K = INDEX                                                 WLXC0220
     25             INDEX = INDEX + IYEAR - JYEAR                             WLXC0230
     26             L = INDEX -1                                              WLXC0240
     27             IL = JMONTH -1                                            WLXC0250
     28             DO 12 I =K,L                                              WLXC0260
     29          10 IL=IL+1                                                   WLXC0270
     30             IF(IL.GT.12)GO TO  11                                     WLXC0280
     31             SUPL(IL,I)= 0.                                            WLXC0290
     32             IFLO(IL,I) = 0.                                           WLXC0300
     33             FOREGL(IL,I) = 0.
     34             TAILGL(IL,I) = 0.
     35             IOUTGL(IL,I) = 0.
     36             IOUT  (IL,I)=0.                                           WLXC0340
     37             GO TO 10                                                  WLXC0350
     38          11 IL=0                                                      WLXC0360
     39          12 CONTINUE                                                  WLXC0370
     40             JMONTH = 1                                                WLXC0380
     41             JYEAR = IYEAR                                             WLXC0390
     42             GO TO 20                                                  WLXC0400
     43          15 IF(IYEAR.EQ.JYEAR)GO TO 20                                WLXC0410
     44             WRITE(6,18)JYEAR, IYEAR                                   WLXC0420
     45             CALL LINECT                                               WLXC0430
     46          18 FORMAT( 9X,29H WRONG YEAR, YEAR EXPECTED IS,I5,15H, YEAR FOUND IS,WLXC0440
     47           * I5,17H, CARD IS IGNORED)                                  WLXC0450
     48             GO TO 1                                                   WLXC0460
     49          20 IF(IMONTH.EQ.JMONTH)GO TO 30                              WLXC0470
     50             IF(JMONTH.EQ.1)GO TO 25                                   WLXC0480
     51             WRITE(6,22)IYEAR                                          WLXC0490
     52             CALL LINECT                                               WLXC0500
     53          22 FORMAT(10X,53H DUPLICATE CARD ENCOUNTERED FOR FIRST HALF OF YEAR, WLXC0510
     54           * I5,14H, CARD IGNORED)                                     WLXC0520
     55             GO TO 1                                                   WLXC0530
     56      C                                                                WLXC0540
```

```
   25 WRITE(6,27) IYEAR                                                 WLXC0550
      CALL LINECT                                                       WLXC0560
   27 FORMAT( 9X,20H FIRST CARD FOR YEAR,I5,50H IS MISSING. ZEROS ARE INWLXC0570
     *SERTED FOR MISSING VALUES)                                        WLXC0580
      JMONTH = 7
      I=0                                                               WLXC0600
   29 I = I + 1                                                         WLXC0610
      IF(I.GT.6)GO TO 30                                                WLXC0620
      SUPL(I,INDEX) = 0.                                                WLXC0630
      IFLOW(I,INDEX) = 0.                                               WLXC0640
      FOREGL(I,INDEX) = 0.
      TAILGL(I,INDEX) = 0.
      IOUTGL(I,INDEX) = 0.
      IOUT  (I,INDEX)=0.                                                WLXC0670
      GO TO 29                                                          WLXC0680
C                                                                       WLXC0690
   30 I = 1                                                             WLXC0700
   40 SUPL(JMONTH,INDEX) =XLEVEL(I)                                     WLXC0710
      IFLOW(JMONTH,INDEX)= OUTFL(I)* 10.0                               WLXC0720
      I=I + 1                                                           WLXC0730
      JMONTH = JMONTH +1                                                WLXC0740
      IF(I.LE.6)GO TO 40                                                WLXC0750
      JMONTH = JMONTH -6                                                WLXC0760
      RETURN                                                            WLXC0770
      END                                                               WLXC0780
```

```
@HDG  ****** MWLXW1/          ******

@PRT,S  HSTG4*STMARY.MWLXW1/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 11:01:16
```

```
HSTG4*STMARY(1).MWLXW1(8)
      SUBROUTINE TWRITE(IYEAR1,INDEX)
C     SUBROUTINE TO OUTPUT MW MATRIX TO MASTER MAGNETIC TAPE
      COMMON/CONW/MW(12,100)
     *      /CONS/IHDG(4)
      DIMENSION NEXTID(5),XVAL(12,3),JHDG(5)
      INTEGER XVAL
      DATA JHDG(5)/4HSTMA/
      IFLAG = 0
      DO 97 I = 1,4
   97 JHDG(I) = IHDG(I)
    1 READ(8) NEXTID,NYRS
      IF(IFLAG.EQ.1.AND.NEXTID(1).EQ.4H9999) GO TO 99
      IF(IFLAG.EQ.1) GO TO 2
      IF(NEXTID(1).EQ.4H9999) GO TO 5
      DO 7 I = 1,5
      IF(NEXTID(I).GT.JHDG(I)) GO TO 5
      IF (NEXTID(I).LT.JHDG(I))GO TO 2
    7 CONTINUE
      GO TO 10
    2 WRITE (9) NEXTID,NYRS
      DO 3 I=1,NYRS
      READ(8) IYEAR,XVAL
    3 WRITE(9) IYEAR,XVAL
      GO TO 1
   10 WRITE(6,11)
   11 FORMAT(//////10X,11CHIDENTIFICATION FOR NEW CASE IS THE SAME AS TH
     *AT FOR THE PREVIOUS ONE, PREVIOUS CASE HAS BEEN DELETED FROM TAPE)
      DO 13 I=1,NYRS
   13 READ(8) IYEAR,XVAL
      READ(8) NEXTID,NYRS
    5 WRITE(6,105)JHDG
  105 FORMAT(1H1,2X, 6HSTUDY(.5A4, 26H) IS BEING WRITTEN ON TAPE)
      WRITE(9) JHDG,INDEX
      IFLAG = 1
      DO 20 J=1,INDEX
      DO 16 K=1,3
      DO 16 I=1,12
   16 XVAL(I,K) = MW(I,J)
      IYEAR = IYEAR1+J
      WRITE(9) IYEAR,XVAL
   20 CONTINUE
      IF(NEXTID(1).NE.4H9999) GO TO 2
   99 WRITE(9) NEXTID,NYRS
      END FILE 9
      REWIND 8
      REWIND 9
      RETURN
      END
```

```
@HDG  ****** MAP/          ******

@PRT,S  HSTG4*STMARY,MAP/
FURPUR 23R1.H2.6 E35 S74T11 05/28/81 11:01:16
```

```
****** MAP/                ******                                                    DATE 052861        PAGE    20

HSTG4*STMARY(1).MAP(6)
      $MSC.N ELEMENT MAP PUNSTREAM
      $MAP,I  ,STMARY,/QT
      IN STMARY.MWLXM2
      IN STMARY.SUBGLP
      IN STMARY.SUBMAXOUT
      IN STMARY.MWLXA1
      IN STMARY.MWLXB1
      IN STMARY.MWLXC1
      IN STMARY.MWLXC1
      IN STMARY.MWLXD1
      IN STMARY.MWLXE1
      IN STMARY.MWLXL1
      IN STMARY.M3D1M1
      END

@HDG  ****** MWLXM2/                ******

$PRT.S  HSTG4*STMARY.MWLXM2/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 11:01:17
```

```
MSTG4*STMARY(1),MULAR2(23)
      DIMENSION MNTH(12),IDIV(12),XC1(4)
C     DATA EXECUTIVE PROGRAMME - ALL DATA INPUT DESCRIBED IN ADDENDUM -
C     METHODOLOGY DESCRIBED IN APPENDIX E
      DATA MNTH/4H JAN,4H FEB,4H MAR,4H APR,4H MAY,4H JUN,4H JUL,4H AUG,
     14H SEP,4H OCT,4H NOV,4H DEC/
      DATA IDIV/250,170,100,500,1250,1350,1650,1700,1400,
     1110*0,1100,500/
      COMMON/COM1/SUPL(12,100),YELO(12,100),HURLEV(12,100),OUT(12,100)
     1   ,FOREGL(12,100),TAILGL(12,100),OUTGL(12,100)
     1       /COM2/IYEAR,JYEAR,IMONTH,JMONTH
     2       /COM3/IMOS(4)
     3       /COM4/IYR1,JYR
     4       /COM5/IOUT(12,100)
      COMMON LINE
      LINE = 52
      READ(5,15) IMOS
   15 FORMAT (4A4)
      CALL LINECT
      CALL CARDS(0)
   30 CALL CARDS(1)
      IYEAR1 = JYEAR
      INDEX = 1
      IF (IYR1.GT.IYEAR1)GO TO 60
      IF (IYR1.LT.IYEAR1)GO TO 40
      GO TO 110
   40 WRITE(6,45)IYEAR1
   45 FORMAT (1H0,75HSTARTING YEARS FOR HURON AND SUPERIOR DATA DO NOT A
     1GREE,  HURON DATA BEFORE,I5,1X,16HHAS BEEN IGNORED)
      CALL LINECT
      M = JYR-IYEAR+1
      DO 50 K=1,M
      L = K+IYEAR1-IYR1
      DO 50 J=1,12
      HURLEV(J,K) = HURLEV(J,M)
   50 CONTINUE
      GO TO 110
   60 WRITE(6,65)IYEAR
   65 FORMAT (1H0,75HSTARTING YEARS FOR HURON AND SUPERIOR DATA DO NOT A
     1GREE, LAKE SUPERIOR DATA,1X, 8HFOR YEAR,I5,16HHAS BEEN IGNORED)
      CALL LINECT
      GO TO 30
  105 CALL CARDS(INDEX)
      IF(IYEAR.NE.9999)GO TO 110
      INDEX = INDEX-1
      CALL DURAT(IYEAR1,INDEX)
      CALL TWRITE(IYEAR1,INDEX)
      CALL EXIT
  110 K=0
      IF(SUPL(JMONTH,INDEX).LE.605.0.AND.SUPL(JMONTH,INDEX).GE.595.0)GO
     1TO 120
      WRITE (6,115) MNTH(JMONTH),JYEAR,SUPL(JMONTH,INDEX)
  115 FORMAT (1H0,23HLAKE SUPERIOR LEVEL FOR,A5,2H, ,I4, 4H IS , F7.2 ,
     1 17H. IT SHOULD BE BETWEEN 595.00 AND 605.00 ET--NO RESULTS FOR TH
     2IS MONTH.)
      CALL LINECT
      K = 1
```

```
      120 IF(IFLOW(JMONTH,INDEX) .LE. 220000 .AND. IFLOW(JMONTH,INDEX) .GE.
     *   40000)GO TO 130
          WRITE (*,125) MNTH(JMONTH),JYEAR,IFLOW(JMONTH,INDEX)
          CALL LIPLOT
      125 FORMAT (1OX,25HLAKE SUPERIOR OUTFLOW FOR,A4,2H, ,I4, 4H IS , I6,
     172H. IT SHOULD BE BETWEEN 40000 AND 220000 CFS. -NO RESULTS FOR IN
     2IS MONTH.)
          K = 1
      130 IF(HURLEV(JMONTH,INDEX).LE.585.0.AND.HURLEV(JMONTH,INDEX).GE.572.0
         1)GO TO 140
          WRITE (*,135)MNTH(JMONTH),JYEAR,HURLEV(JMONTH,INDEX)
          CALL LIPLOT
      135 FORMAT (10X,20HLAKE HURON LEVEL FOR,A4,2H, ,I4,4H IS ,F7.2,72H. IT
         1 SHOULD BE BETWEEN 572.00 AND 585.00 FT. -NO RESULTS FOR THIS MONT
         2H.)
          K = 1
      140 IF(K.EQ.0)GO TO 160
      150 FOREGL(JMONTH,INDEX) = 0.0
          TAILGL(JMONTH,INDEX) = 0.0
          REGOGL = 0.0
          OUTGL(JMONTH,INDEX) = 0.0
          K = 0
          GO TO 250
C         CALCULATION OF ELG11 BY G DEVIDED BY THE SQUARE ROOT OF F EQN.
      160 FLOW = IFLOW(JMONTH,INDEX)
          PARA = 135115.
          IF(JMONTH.LT.7) PARA = 1.7E70.
          FALL = (FLOW/PARA)**2
          ELG11 = SUPL(JMONTH,INDEX) - FALL
C         CALCULATION OF PERMISSIBLE CANADIAN DIVERSION
      180 IQC = (IFLOW(JMONTH,INDEX) - (IDIV(JMONTH)+2000))/2
      190 QC = IQC
          QC1=IQC
C         CALCULATION OF ELG12
          IF(JMONTH.GT.3) GO TO 230
          C12 = 250000.
          C12A = 587.0
          C12B = 587.75
          C12C = 1.0
          C2 = 1142.14
          C1 = .0002926
          GO TO 240
      230 C12 = 200000.
          C12A = 585.0
          C12B = 585.0
          C12C = 1.2
          C2 = 1131.20
          C1 = .0002275
      240 FLOW = IFLOW(JMONTH,INDEX)
C         INITIAL VALUE OF ELG12
          ELG12 = C1*A - (C12B - HURLEV(JMONTH,INDEX)) * (C12C-ELG*/C12)
          IF(HURLEV(JMONTH,INDEX).GT.583.0) ELG12 = HURLEV(JMONTH,INDEX)+1.0
          ELG12 = CALC(ELG12,HURLEV(JMONTH,INDEX),FLOW,C1,C2)
C         CALCULATION OF HEADWATER AND TAILWATER ELEVATION
          CALL GLP(ELG11,ELG12,QC,FH,FT)
          FOREGL(JMONTH,INDEX)=FH
          TAILGL(JMONTH,INDEX)=FT
```

```
      C       CALCULATION OF HEAD
              HEADGL = FORMGL(JMONTH,INDEX) - TAILGL(JMONTH,INDEX)
              IF(HEADGL.LT.0.0) GO TO 310
      C       CALCULATION OF PLANT EFFORT
              EFFORT=SQRT(HEADGL/1.0E0)*1.5E0
              WIN=SQRT(EFFORT/1.0E0)*5.0E0
              IF(WIN.LT.5.0)GO TO 320
              CALL CYCLE(0.0E0,1.0E0,1,WIN,FM,FT)
              FORM(JMONTH,INDEX)=FM
              TAILGL(JMONTH,INDEX)=FT
              HEADGL=FORMGL(JMONTH,INDEX)-TAILGL(JMONTH,INDEX)
              IF(HEADGL.LT.0.0)GO TO 310
              OUTGL(JMONTH,INDEX)=(HEADGL/19.69)**1.5*32.2
              OUT(JMONTH,INDEX)=OUTGL(JMONTH,INDEX)
              IOUT(JMONTH,INDEX)=OUTGL(JMONTH,INDEX)+0.5
              GO TO 2
        805   IF(QC.GT.QMIN)GO TO 810
              OUTGL(JMONTH,INDEX)=0.072691*HEADGL*QC/1000.
              OUT(JMONTH,INDEX)=OUTGL(JMONTH,INDEX)
              IOUT(JMONTH,INDEX)=OUTGL(JMONTH,INDEX)+0.5
              GO TO 2
        810   DATA XC1/2.617E-2,5.347E-5,5.346E-9,-3.158745E-13/
              OUTGL(JMONTH,INDEX)=(XC1(1)*HEADGL**1.5)+(XC1(2)*QC*
             1HEADGL)+(XC1(3)*QC**2*HEADGL**.5)+(XC1(4)*QC**3)
              OUT(JMONTH,INDEX)=OUTGL(JMONTH,INDEX)
              IOUT(JMONTH,INDEX) =OUTGL(JMONTH,INDEX)+0.5
        2*C   WRITE(6,2*5) IYEAR,MATH(JMONTH),SUFL(JMONTH,INDEX),IFLOW(JMONTH,IN
             1DEX),HUPLEV(JMONTH,INDEX),QCIN,QC,FOREGL(JMONTH,INDEX),
             2TAILGL(JMONTH,INDEX),HEADGL,OUTGL(JMONTH,INDEX)
              CALL LINECT
        285   FORMAT(1X,I4,3A,7X,F6.2,7X,I6,7X,F6.2,7X,2(F6.0,7X),
             1(F6.2,7X),F5.2,5X,F6.1)
              JMONTH = JMONTH + 1
              GO TO(110,110,110,110,110,110,105,110,110,110,110,110,300),JMONTH
          300 JMONTH = 1
              IYEAR = IYEAR + 1
              INDEX = INDEX + 1
              GO TO 105
          310 WRITE(6,*2J)HEADGL
          320 FORMAT(10X,'HEAD IS ',F7.2,' - TOO LOW. NO RESULTS FOR THIS MONTH.
             *')
              CALL LINECT
              GO TO 150
              END
```

-97-

```
$END
$END IGNORED - IN CONTROL MODE

$EOF
```

****** MULXM2/ ****** DATE 052881 PAGE 24

RUNID:XLERIE ACCT:AN9520 PROJ:HSTC4 MAX SUPS 00:10:00

SEND OUTPUT TO DEVT=H15F3

XLERIE FIN

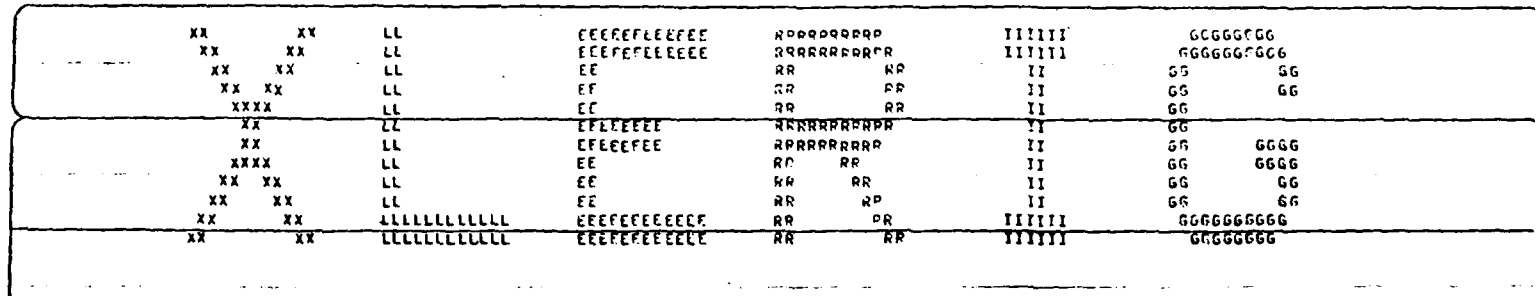
PRIORITY: P TAPEMOUNTS: 0 MAX SERVOS: 0 ACTUAL SUPS 00:00:32

MAX CORE: 22016 MAX TRACKS: 16 CPU TIME 00:00:00

IMAGES IN: 40 CARDS OUT: 0 PAGES OUT: 25

LAPSED MINS: 1 ARR 10:56 TERM 11:01:21 28MAY81 COST $ .48

* * * * * * UNIVAC 1100 TIME/SHARING EXEC --- MULTI-PROCESSOR SYSTEM --- LEV. 11d2*V52 SITE * U11-80 * * * * * *




```
DDDDDDD    EEEEEEEE  NN      NN  TTTTTTTT          KK    KK          GGGGGGG
DDDDDDDD   EEEEEEEE  NNN     NN  TTTTTTTT          KK   KK          GGGGGGGG
DD     DD  EE        NNNN    NN     TT             KK  KK          GG
DD     DD  EE        NN NN   NN     TT             KK KK           GG
DD     DD  EE        NN  NN  NN     TT             KKKK            GG
DD     DD  EEEEE     NN   NNNN     TT             KKK             GG
DD     DD  EEEEE     NN    NNN     TT             KKK             GG
DD     DD  EE        NN     NN     TT             KKKK            GG
DD     DD  EE        NN     NN     TT             KK KK           GG    GG
DD     DD  EE        NN     NN     TT             KK  KK          GG    GG
DDDDDDDD   EEEEEEEE  NN     NN     TT             KK   KK         GGGGGGGG
DDDDDDD    EEEEEEEE  NN     NN     TT             KK    KK         GGGGGG
```

```
@ENT K G
```

```
* * * * * * UNIVAC 1100 TIME/SHARING EXEC --- MULTI-PROCESSOR SYSTEM --- LEV. 1182*V52     SITE * U11-80  * * * * * *
```

```
HH     HH    1   5555555  FFFFFFFF  3333333
HH     HH   11   5555555  FFFFFFFF  3333333
HH     HH  111   55       FF              33
HH     HH   11   55       FF              33
HH     HH   11   55       FF              33
HHHHHHHHH   11    55555   FFFFF        33
HHHHHHHHH   11       55   FFFFF        33
HH     HH   11       55   FF              33
HH     HH   11       55   FF              33
HH     HH   11   55  55   FF              33
HH     HH   11    55555   FF          33  33
HH     HH  1111    555    FF        3333333
```

```
HISF3
```

```
   RUNID * XLERIG        USER ID * GWTP          PART NUMBER * 00     INPUT DEVICE *              OUTPUT DEVICE * PRS
     FILE NAME * PR@OOMXLERIG          CREATED AT:  16:06:46 MAY 28,1981          PRINTED AT:  16:09:34 MAY 28,1981
```

```
@RUN,P     XLERIE,AY9320/GWTP,HSTG4,10,500
@LGO SEND OUTPUT TO DENT-HISF3
@ASG,A NIAGI.
```

J4*NIAG1.72
RIH3 05/29/81 16:06:49

SSG STREAM GENERATION STATEMENTS

Z	SUBDUPLT	5
Z	RETMAPLOAD	1, 1
Z	SUBPOS	5
Z	SUBDUR	5
Z	SUBMONTH	5
Z	SUBDAY	5
Z	SUBMONTH	1, 1
Z	SUBDUR	1, 1
Z	SUBPEAK	1, 1
Z	SUBPEAK	5
Z	SUBPOND	5
Z	SUBCAS	1, 1
Z	SUBCAS	5
Z	SUBTOTAL	5
Z	MULZW1	5
Z	MULZW2	5
Z	SUBSCHEME	5
Z	SUBDAY	1, 1
Z	SUBPOND	1, 1
Z	SUBTOTAL	1, 1
Z	MULZW1	1, 4
Z	MULZW2	1, 4
Z	SUBDURPLT	1, 1
Z	SUBSCHEME	1, 1
Z	SUBPOS	1, 1
Z	ADJUST	1, 1
Z	ADJUST	5
Z	MAPLOAD	1, 1
Z	SUBDEC	1, 1
Z	SUBDEC	5
Z	LOAD	1, 1
Z	LOAD	5
Z	LOAD	6

```
SSG  REVISED  SKELETON

0001  00    *INCREMENT A FROM 1 BY 1 TO [Z]
0002  01      *IF [Z,A,3,1] <5
0003  02        &HOG  ****** [Z,A,1,1]/[Z,A,2,1] ******
0004  02        #PRT,S  HSTG4*NIAG1.[Z,A,1,1]/[Z,A,2,1]
0005  01      *END
0006  00    *LOOP
```

```
SSG   GENERATED OUTPUT STREAM       PART 1

000031              @HDG  ****** RELMAPLOAD/              ******
000032              @PRT,S  HST64*NIAG1.RELMAPLOAD/
000033              @HDG  ****** SUBMONTH/                ******
000034              @PRT,S  HST64*NIAG1.SUBMONTH/
000035              @HDG  ****** SUBDUR/                 ******
000036              @PRT,S  HST64*NIAG1.SUBDUR/
000037              @HDG  ****** SUBPEAK/                ******
000038              @PRT,S  HST64*NIAG1.SUBPEAK/
000039              @HDG  ****** SUBCAS/                 ******
000040              @PRT,S  HST64*NIAG1.SUBCAS/
000041              @HDG  ****** SUBBHW/                 ******
000042              @PRT,S  HST64*NIAG1.SUBBHW/
000043              @HDG  ****** SUBPOND/                ******
000044              @PRT,S  HST64*NIAG1.SUBPOND/
000045              @HDG  ****** SUBTOTAL/                ******
000046              @PRT,S  HST64*NIAG1.SUBTOTAL/
000047              @HDG  ****** MWLZW1/                 ******
000048              @PRT,S  HST64*NIAG1.MWLZW1/
000049              @HDG  ****** MWLZW2/                 ******
000050              @PRT,S  HST64*NIAG1.MWLZW2/
000051              @HDG  ****** SUBOURPLT/                ******
000052              @PRT,S  HST64*NIAG1.SUBOURPLT/
000053              @HDG  ****** SUBSCHEME/                ******
000054              @PRT,S  HST64*NIAG1.SUBSCHEME/
000055              @HDG  ****** SUBPGS/                 ******
000056              @PRT,S  HST64*NIAG1.SUBPGS/
000057              @HDG  ****** ADJUST/                 ******
000058              @PRT,S  HST64*NIAG1.ADJUST/
000059              @HDG  ****** MAPLOAD/                 ******
000060              @PRT,S  HST64*NIAG1.MAPLOAD/
000061              @HDG  ****** SUBDEC/                 ******
000062              @PRT,S  HST64*NIAG1.SUBDEC/
000063              @HDG  ****** LOAD/                 ******
000064              @PRT,S  HST64*NIAG1.LOAD/

END SSG     TIME =  00:00:01  HIGHEST ADDRESS =  0061552  OCTAL

@HDG  ****** RELMAPLOAD/              ******

@PRT,S  HST64*NIAG1.RELMAPLOAD/
FURFUR 28R1.M2.6 E35 S74T11 05/28/81 16:06:51
```

```
****** RELMAPLOAD/                ******                                    DATE 052881        PAGE    6

HSTG4*NIAG1(1),RELMAPLOAD(5)
        @SFOR NIAG.LOAD
        @
        @MAP,N ,NIAG.LOAD
        IN SYS$HYDRO*LIB.GETDAY
        IN NIAG.LOAD
        IN NIAG.SUBMONTH
        IN NIAG.SUBDUR
        IN NIAG.SUBDURPLT
        IN NIAG.SUBBHW
        IN NIAG1.SUBPEAK
        IN NIAG1.SUBPGS
        IN NIAG.SUBCAS
        IN NIAG.SUBDEC
        END

@HDC  ****** SUBMONTH/              ******

@PRT,S  HSTG4*NIAG1.SUBMONTH/
FURPUR 28R1.H2.6 E35 S74T11 05/26/81 16:06:51
```

```
HSTG4*NIAG1(1).SUBMONTH(6)
      SUBROUTINE MONTH(M,IY,MD,AM)
C        CALCULATION OF DAYS IN MONTH AND NAME OF MONTH
C        BASED ON INTEGER VALUE OF MONTH AND YEAR
C          M = INTEGER VALUE OF MONTH
C          IY = LAST TWO DIGITS OF THE YEAR
C          MD = CALCULATED NO. OF DAYS IN THE MONTH
C          AM = ALPHANUMERIC MONTH LABEL
      DIMENSION AM(2),AMON(12,2)
      DATA ((AMON(I,J),J=1,2),I=1,12)/'JANUAR','Y','FEBRUA','RY',
     1'MARCH','  ','APRIL','  ','MAY','  ','JUNE','  ','JULY',
     1'  ','AUGUST','  ','SEPTEM','BER','OCTOBE','R','NOVEMB',
     1'ER','DECEMB','ER'/
      IF((M.GT.12).OR.(M.LT.1))GO TO 50
      GO TO (31,28,31,30,31,30,31,31,30,31,30,31),M
   30 MD=30
      GO TO 32
   31 MD=31
      GO TO 32
   28 IY=1900+IY
      ITY=IY/4
      ITY=ITY*4
      MD=28
      IF(ITY.EQ.IY) MD=29
   32 CONTINUE
      DO 1 I=1,2
    1 AM(I)=AMON(M,I)
      GO TO 13
   50 WRITE(6,55)
   55 FORMAT(10X,'***ERROR- M.GT.12.OR.M.LT.1')
   13 RETURN
      END
```

@HDG ****** SUBDUR/ ******

```
@PRT,S  HSTG4*NIAG1.SUBDUR/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 16:06:51
```

-78-

```
HSTG4*NIAG1(1).SUBDUR(19)
      1            COMPILER (XM=1)
      2            SUBROUTINE DUP(A,NOV,IY1,N98,N50,VALUE,VALSO)
      3      C     DURATION ROUTINE TO SORT INPUT VALUES
      4      C           A - UNSORTED VECTOR
      5      C           S - SORTED VECTOR
      6      C           P - DURATION PERCENT
      7      C           M - ORIGINAL POSITION OF SORTED ELEMENT
      8            DIMENSION A(1200)
      9            COMMON QBAC(100,12),QBECK(100,12),QISDEC(100,12),
     10           1POP(100,12),PCNP(100,12),PDFC(100,12),PBK(100,12),
     11           1PTOT(100,12),PTOTA(100,12),P(1200),S(1200),MOR(1200)
     12            IF(NOV.GT.1200) GO TO 6
     13            IF(N98.EQ.1) GO TO 7
     14            IF(NOV.GE.25)GO TO 7
     15            WRITE(6,45)
     16            GO TO 7
     17      6     WRITE(6,200)
     18            GO TO 999
     19      7     L=0
     20            IDUM=0
     21            IDSO=0
     22      5     L=L+1
     23            XM=0.0
     24            IF(L.GT.NOV) GO TO 13
     25            DO 32 I=1,NOV
     26            IF(L.EQ.1) GO TO 11
     27            LM1=L-1
     28            DO 10 N=1,LM1
     29            IF(I.EQ.MOR(N)) GO TO 32
     30     10     CONTINUE
     31     11     IF(XM.LE.A(I)) GO TO 20
     32            GO TO 32
     33     20     XM=A(I)
     34            MOR(L)=I
     35     32     CONTINUE
     36            GO TO 5
     37     13     DO 12 K=1,NOV
     38            ID=0
     39            N=MOR(K)
     40            S(K)=A(N)
     41     15     P(K)=(((2.*(FLOAT(K)))-1.)/(2.*(FLOAT(NOV))))*100.
     42            IF(N50.EQ.1)GO TO 65
     43            IF(P(K).EQ.50.0)GO TO 60
     44            IF(P(K).GT.50.0)GO TO 70
     45     65     IF(N98.EQ.1)GO TO 12
     46            IF(NOV.LT.25)GO TO 12
     47            IF(P(K).EQ.98.0)GO TO 80
     48            IF(P(K).GT.98.0)GO TO 40
     49            GO TO 12
     50     60     VALSO=S(K)
     51            IDSO=1
     52            GO TO 12
     53     70     IF(IDSO.EQ.1)GO TO 65
     54            IJ=K-1
     55            IDSO=1
     56            VALSO=S(K)+(((S(IJ)-S(K))/(P(K)-P(IJ)))*(P(K)-50.0))
```

```
      GO TO 12
80    VALUE=S(K)
      IDUM=1
      GO TO 12
40    IF(IDUM.EQ.1)GO TO 12
      J=K-1
      IDUM=1
      VALUE=S(K)+(((S(J)-S(K))/(P(K)-P(J)))*(P(K)-98.0))
12    CONTINUE
      IF(N98.EQ.1)VALUE=0.0
      IF(N50.EQ.1)VAL50=0.0
500   FORMAT()
45    FORMAT(1H1,'SORT VECTOR TOO SMALL FOR 98% VALUE-MUST BE >25',/)
200   FORMAT(1H1,' SORT VECTOR TOO LARGE - MUST BE <1200',/)
999   RETURN
      END
```

@HOG ****** SUBPEAK/ ******

@PRT,S HSTG4*NIAG1.SUBPEAK/
FURPUR 28R1.M2.6 E3S S7*T11 05/28/81 16:06:52

```
HSTC**NIAG1(1).SUBPEAK(21)
      C     NIAGARA PEAK PROGRAM- CALCULATION OF PEAK VALUES
      C     FOR EACH STATION BASED ON MONTH,BECK DAYTIME DISCHARGE(QBECK)
      C     BECK AND CASCADES DAYTIME DISCHARGE(QBAC) AND
      C     DECEW DISCHARGE (DISDEC)
            COMPILER (XM=1)
            SUBROUTINE PEAK(NOY,MS,MF)
            COMMON QBAC(100,12),QBECK(100,12),DISDEC(100,12),
     1POP(100,12),PCNP(100,12),POEC(100,12),PBK(100,12),
     1PTOT(100,12),PTOTA(100,12),P(1200),S(1200),MOR(1200)
            DO 200 I=1,NOY
            DO 300 J=MS,MF
      C     WRITE(6,333)I,J,QBECK(I,J),QBAC(I,J)
      C     FORMAT(I2,1X,J2,1X,'QBECK= ',F8.0,5X,'QBAC= ',F8.0)
            IF(J.LT.4.OR.J.GT.10)GO TO 10
            POP(I,J)=0.011475+QBAC(I,J)-625.98361
            IF(POP(I,J).GT.105.0)POP(I,J)=105.0
            IF(POP(I,J).LT.0.0)POP(I,J)=0.0
            PCNP(I,J)=0.0076+QBAC(I,J)-482.978
            IF(PCNP(I,J).GT.75.0)PCNP(I,J)=75.0
            IF(PCNP(I,J).LT.0.0)PCNP(I,J)=0.0
            IF(QBECK(I,J).GT.55500.)GO TO 20
            IF(QBECK(I,J).GT.51000..AND.QBECK(I,J).LE.55500.)GO TO 30
            IF(QBECK(I,J).GT.41000..AND.QBECK(I,J).LE.51000.)GO TO 40
            IF(QBECK(I,J).GT.28000..AND.QBECK(I,J).LE.41000.)GO TO 50
            PBK(I,J)=651.14286+25.10714E-3*QBECK(I,J)-53.57143E-9
     1*QBECK(I,J)**2
            IF(PBK(I,J).LT.0.0)PBK(I,J)=0.0
            GO TO 100
   50       PBK(I,J)=818.540116+14.632403E-3*QBECK(I,J)+107.45965E-9
     1*QBECK(I,J)**2
            GO TO 100
   40       PBK(I,J)=474.97232+14.925E-3*QBECK(I,J)+66.9643E-9*QBECK(I,J)**2
            GO TO 100
   30       PBK(I,J)=-927.94586+89.71354E-3*QBECK(I,J)-706.45217E-9
     1*QBECK(I,J)**2
            IF(PBK(I,J).GT.1875.0)PBK(I,J)=1875.0
            GO TO 100
   20       PBK(I,J)=1875.0
            GO TO 100
   10       POP(I,J)=0.0106061*QBAC(I,J)-570.60606
            IF(POP(I,J).GT.105.0)POP(I,J)=105.0
            IF(POP(I,J).LT.0.0)POP(I,J)=0.0
            PCNP(I,J)=0.0038030*QBAC(I,J)-241.7426
            IF(PCNP(I,J).LT.0.0)PCNP(I,J)=0.0
            IF(PCNP(I,J).GT.75.0)PCNP(I,J)=75.0
            IF(J.LT.4)GO TO 60
            GO TO 101
   60       IF(PCNP(I,J).GT.7.6)PCNP(I,J)=7.6
  101       IF(QBECK(I,J).GT.54500.)GO TO 110
            IF(QBECK(I,J).GT.51000..AND.QBECK(I,J).LE.54500.)GO TO 120
            IF(QBECK(I,J).GT.36000..AND.QBECK(I,J).LE.51000.)GO TO 130
            PBK(I,J)=646.56548+25.8006E-3*QBECK(I,J)-63.988E-9*QBECK(I,J)**2
            IF(PBK(I,J).LT.0.0)PBK(I,J)=0.0
            GO TO 100
  130       PBK(I,J)=729.4+20.2343E-3*QBECK(I,J)+25.53817E-9*QBECK(I,J)**2
            GO TO 100
```

```
      120   PBK(I,J)=-2078.9231+0.1342256*QBECK(I,J)-1.13006E-6*QBECK(I,J)**2
            IF(PBK(I,J).GT.1880.)PBK(I,J)=1880.
            GO TO 100
      110   PBK(I,J)=1880.
      100   PDEC(I,J)=153.26575+1.484558E-3*DISDEC(I,J)-202.0055E-9
           1*DISDEC(I,J)**2
            IF(DISDEC(I,J).GE.6800.)PDEC(I,J)=154.6
            PTOT(I,J)=POP(I,J)+PCNP(I,J)+PDEC(I,J)+PBK(I,J)
            PTOTA(I,J)=PTOT(I,J)-75.0
      C     WRITE(6,444)POP(I,J),PCNP(I,J),PBK(I,J),PDEC(I,J),
      C    1PTOT(I,J),PTOTA(I,J)
      C     FORMAT(6F8.2)
      300   CONTINUE
      200   CONTINUE
            RETURN
            END
```

@HDG ****** SUBCAS/ ******

```
@PRT,S  HSTG4*NIAG1.SUBCAS/
FURPUR 28R1.H2.6 E35 574T11 05/28/81 16:06:52
```

```
HSTG4*NIAG1(1).SUBCAS(5)
      SUBROUTINE CAS(QC,J,ENDR,ITIME,QB,QBA,QOP,QCNP)
C     CALCULATION OF DISCHARGE FOR OP CNP AND BECK ADJUSTED
C    USING CASCADE DISCHARGE AND BECK DISCHARGE AS INPUT
C     INPUT VALUES QC,J,ITIME,QB
C     OUTPUT VALUES QBA,QOP,QCNP
      IF(QC.EQ.0.0) GO TO 10
      IF(QC.GT.8300.0) GO TO 20
      QOP=QC
      QCNP=0.0
      QBA=QB
      GO TO 50
20    QOP=8300.0
      QCNP=QC-QOP
      QBA=QB
      GO TO 50
10    QOP=0.0
      QCNP=0.0
      QBA=QB
50    RETURN
      END

@HDG ****** SUBBHW/ ******

@PRT,S  HSTG4*NIAG1,SUBBHW/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 16:06:53
```

```
HSTG4*NIAG1(1).SUBBHW(2)
      SUBROUTINE BHW(QTEST,EMD,MON,QB,HW)
C     HEADWATER ELEVATION CALCULATIONS FOR BECK G.S.
C     HEADWATER IS USED IN ENERGY CALCULATIONS FOR BECK
C     OUTPUT IS HEADWATER LEVEL HW AND BACK DISCHARGE QB
      DIMENSION C(5)
      IF(MON.GT.1.AND.MON.LT.6) GO TO 1
      IF(MON.GT.8) GO TO 2
      C(1)=-0.1277405E-03
      C(2)=-0.2766605E-02
      C(3)= 0.1431810E+00
      C(4)=-0.2052657E+01
      C(5)= 0.1057558E+02
      GO TO 3
1     C(1)= 0.4084246E-03
      C(2)=-0.1404717E-01
      C(3)= 0.2154076E+00
      C(4)=-0.2123795E+01
      C(5)= 0.9633192E+01
      GO TO 3
2     C(1)= 0.1975383E-03
      C(2)=-0.9735033E-02
      C(3)= 0.1887179E+00
      C(4)=-0.2099886E+01
      C(5)= 0.1169494E+02
3     HW=540.0
      GO TO 4
5     HW=HW+0.05
4     T1=SQRT(EMD-HW)
      T4=QTEST/T1
      T2=(((EMD+HW)/2.0)-547.5)*.788
      T3=C(5)
      DO 6 I=4,1,-1
      T3=(C(5-I)*(T2**I))+T3
6     CONTINUE
      T3=15600.0-(T3*253.807107)
      IF(HW.GT.540.0) GO TO 7
      IF(T3.LT.T4) GO TO 8
7     IF(T3.LT.T4) GO TO 9
      QUP=T3
      HWL=HW
      GO TO 5
9     QLOW=T3
      HW=HWL+((0.05/(QUP-QLOW))*(QUP-T4))
      QB=T4*T1
      RETURN
C     WRITE(6,500) QB,HW,MON
8     QB=T3*T1
      RETURN
C     WRITE(6,500) QB,HW
500   FORMAT()
      END

&HDG ****** SUBPOND/ ******
```

****** SUBPOND/ ******

DATE 052881 PAGE 14

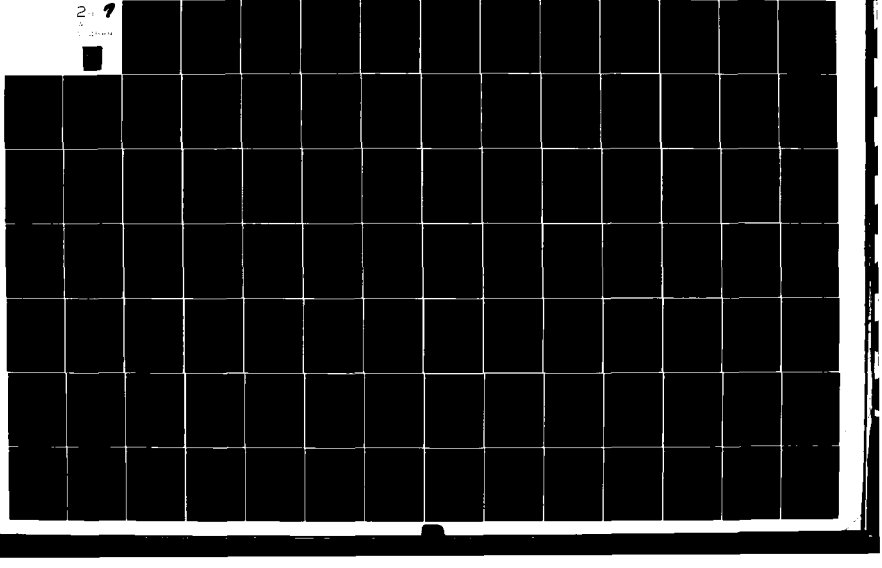
@PRT,S HSTG4*NIAG1.SUBPOND/
FURFUR 28R1.H2.6 E35 S74T11 05/28/81 16:06:54

-85-

```
HSTG4*NIAG1(1).SUBPOND(2)
      SUBROUTINE POND(QOP,QCA,PD,PN,IFLAG)
C     CALCULATION OF DAY/NIGHT PONDING PD, PN
C     INPUT OP, DISCHARGE QOP AND CANADIAN SHARE QCA
C     FLAG IFLAG=1 INDICATES PONDING ON CONDITION
      IF(QOP.GT.7190.)PN=7190
      IF(QOP.LE.7190.)PN=QOP
      PD=PN*(10.43/13.57)
      QCA=QCA-PN
      IFLAG=1
      RETURN
      END

@HDG  ****** SUBTOTAL/          ******

@PRT,S  HSTG4*NIAG1.SUBTOTAL/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 16:06:54
```

AD-A114 589 INTERNATIONAL LAKE ERIE REGULATION STUDY BOARD F/G 13/2
LAKE ERIE WATER LEVEL STUDY. APPENDIX E. POWER. ANNEX D. COMPUT--ETC(U)
JUL 81

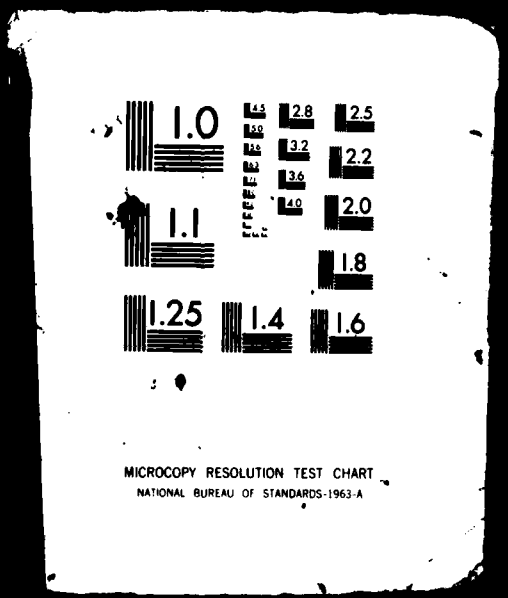
UNCLASSIFIED NL



2 OF 7

AD

A114589



```
HSTG4*NIAG1(1).SUBTOTAL(5)
                SUBROUTINE TOTAL(ETD,ETN,PEAT,NOY,MS,MF)
        C       SETS UP MATRIX MW FOR OUTPUT ONTO MASTER TAPE
        C       INPUT IS TOTAL DAY, TOTAL NIGHT ENERGIES AND PEAK
                COMMON MW(12,100,3)
                DIMENSION ETD(100,12),ETN(100,12),PEAT(100,12)
                DO 10 K=1,3
                DO 20 J=1,NOY
                DO 30 I=MS,MF
                IF(K.EQ.1)MW(I,J,K)=ETD(J,I)+0.5
                IF(K.EQ.2)MW(I,J,K)=ETN(J,I)+0.5
        30      IF(K.EQ.3)MW(I,J,K)=PEAT(J,I)+0.5
        20      CONTINUE
        10      CONTINUE
                RETURN
                END

@HDG  ****** MWLZW1/          ******

@PRT,S  HSTG4*NIAG1.MWLZW1/
FURPUR 23R1.H2.6 E35 S74T11 05/28/81 16:06:55
```

```
HSTG4*NIAG1(1).MWLZW1(12)
      SUBROUTINE TWRITE(IYR1,INDEX,IH)                                  Y
C     SUBROUTINE THAT OUTPUT MW MATRIX TO MASTER MAGNETIC TAPE
C     INPUT IS START YEAR IYR1, TOTAL NO. OF YRS INDEX AND HEADING IH
C     MATRIX MW TRANSFERED BY COMMON STATEMENT
      COMMON MW(12,100,3)
      DIMENSION NEXTID(5),XVAL(12,3),JHDG(5),IH(4)                      Y
      INTEGER XVAL                                                      Y
      DATA JHDG(5)/4HNIAG/
      IFLAG = 0
      DO 97 I = 1,4                                                     Y
   97 JHDG(I) = IH(I)                                                  Y
    1 READ(8) NEXTID,NYRS                                               Y
      IF(IFLAG.EQ.1.AND.NEXTID(1).EQ.4H9999) GO TO 99
      IF(IFLAG.EQ.1) GO TO 2
      IF(NEXTID(1).EQ.4H9999) GO TO 5
      DO 7 I = 1,5                                                      Y
      IF(NEXTID(I).GT.JHDG(I)) GO TO 5                                  Y
      IF (NEXTID(I).LT.JHDG(I))GO TO 2                                  Y
    7 CONTINUE                                                          Y
      GO TO 10                                                          Y
    2 WRITE (9) NEXTID,NYRS                                             Y
      DO 3 I=1,NYPS                                                     Y
      READ(8) IYEAR,XVAL                                                Y
    3 WRITE(9) IYEAR,XVAL                                               Y
      GO TO 1                                                           Y
   10 WRITE(6,11)                                                       Y
   11 FORMAT(//////10X,110HIDENTIFICATION FOR NEW CASE IS THE SAME AS TH Y
     *AT FOR THE PREVIOUS ONE, PREVIOUS CASE HAS BEEN DELETED FROM TAPE) Y
      DO 13 I=1,NYRS                                                    Y
   13 READ(8) IYEAR,XVAL                                                Y
      READ(8) NEXTID,NYPS                                               Y
    5 WRITE(6,105) JHDG
  105 FORMAT(1H1,9X, 6HSTUDY(,5A4, 26H) IS BEING WRITTEN ON TAPE)
      WRITE(9) JHDG,INDEX
      IFLAG = 1
      IYR1=IYR1-1
      DO 20 J=1,INDEX                                                   Y
      DO 16 K=1,3                                                       Y
      DO 16 I=1,12
   16 XVAL(I,K) = MW(I,J,K)
      IYEAR = IYR1+J                                                   Y
      WRITE(9) IYEAR,XVAL                                               Y
   20 CONTINUE                                                          Y
      IF(NEXTID(1).NE.4H9999) GO TO 2
   99 WRITE(9) NEXTID,NYRS                                              Y
      END FILE 9                                                        Y
      REWIND 8
      REWIND 9
      RETURN                                                            Y
      END                                                               Y
```

@HDG ****** MWLZJ2/ ******

@PRT.S HSTG4*NIAG1.MWLZJ2/

```
HSTG4*NIAG1(1).MWL2J2(2)
      SUBROUTINE PGS1(DAYMWH,EVEMWH,O,JMONTH)
C     CALCULATION OF PGS GAIN/LOSS IN MWHR
      REAL IRFLOW
      IRFLOW=O
C
      DIMENSION CDGTS(3,4),CDGNTS(3,4),CNLTS(3),CNLNTS(3),RANGE(4,2)
C
      DATA ((CDGTS(I,J),I=1,3),J=1,4) /.48377779E+04,.44444767E-03,0.0,
     *    .60299926E+04,-.59999926E-02,0.0,-.20065164E+05,.2469465E+00,
     *    -.61239208E-06,.3550809E+05,-.25325306E+00,.51263672E-06/
      DATA ((CDGNTS(I,J),I=1,3),J=1,4) /-.5301271E+04,.13931033E+00,
     *    -.47710912E-06,.31219505E+05,-.26877643E+00,.7771286E-06,
     *    .62921232E+04,-.16141039E-01,.31800356E-07,.45380057E+04,
     *    -.11600247E-02,0.0/
      DATA  CNLTS   /0.49576263E+04,0.49802542E-02,-0.12500668E-07/
      DATA  CNLNTS   /0.51179347E+04,0.3339158E-02,-0.80372549E-08/
      DATA ((RANGE(I,J),I=1,4),J=1,2) /185000.,205000.,220000.,240000.,
     *                                 170000.,185000.,220000.,240000./
C
      IF (JMONTH .GE. 4 .AND. JMONTH .LE. 10)  GO TO 100
      EVENL = CNLNTS(1) + CNLNTS(2)*IRFLOW + CNLNTS(3)*IRFLOW*IRFLOW
      DO 10 I=1,4
      IF(O .LE. RANGE(I,2))GO TO 20
   10 CONTINUE
      DAYGN=4260.
      GO TO 30
   20 DAYGN=CDGNTS(1,I) + CDGNTS(2,I)*IRFLOW + CDGNTS(3,I)*IRFLOW**2
   30 EVEMWH=EVEMWH - EVENL
      DAYMWH = DAYMWH + DAYGN
      RETURN
  100 EVENL = CNLTS(1)+CNLTS(2)*IRFLOW+CNLTS(3)*IRFLOW*IRFLOW
      DO 110 I=1,4
      IF(O .LE. RANGE(I,1))GO TO 120
  110 CONTINUE
      DAYGN=4260.
      GO TO 130
  120 DAYGN=CDGTS(1,I) + CDGTS(2,I)*IRFLOW + CDGTS(3,I)*IRFLOW**2
  130 EVEMWH=EVEMWH - EVENL
      DAYMWH = DAYMWH + DAYGN
      RETURN
      END

@HDG  ****** SUBDURPLT/          ******

@PRT,S  HSTG4*NIAG1.SUBDURPLT/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 16:06:57
```

```
HSTG4*NIAG1(1).SUBDURPLT(2)
      1            SUBROUTINE DURPLT(E,PER,K,TITL,AM,IYS,IYF)
      2      C   PLOTTING ROUTINE FOR RESULTS-NOT TESTED AS OF NOV.13,1978 - NOT USED
      3            DIMENSION E(1202),PER(1202),TITL(2),AM(2)
      4            YEAR1=IYS+1900
      5            YEAR2=IYF+1900
      6            CALL PLOT(0.0,1.0,-3)
      7            CALL SYMBOL(0.0,0.0,.07,03,0.0,-1)
      8            CALL SYMBOL(0.0,11.69,.07,03,0.0,-1)
      9            CALL SYMBOL(16.54,11.69,.07,03,0.0,-1)
     10            CALL SYMBOL(16.54,0.0,.07,03,0.0,-1)
     11            CALL PLOT(1.0,.345,-3)
     12            CALL RECT(0.0,0.0,11.0,15.0,0.0,3)
     13            CALL SYMBOL(0.0,-0.5,.14,17HDURATION PLOT OF ,0.0,+17)
     14            CALL SYMBOL(999.,999.,.14,TITL,0.0,+12)
     15            CALL SYMBOL(999.,999.,.14,12H ENERGY FOR ,0.0,+12)
     16            CALL SYMBOL(999.,999.,.14,AM,0.0,+12)
     17            CALL NUMBER(999.,999.,.14,YEAR1,0.0,-1)
     18            CALL SYMBOL(999.,999.,.14,3H - ,0.0,+3)
     19            CALL NUMBER(999.,999.,.14,YEAR2,0.0,-1)
     20            CALL PLOT(1.0,1.0,-3)
     21            CALL PLOT(0.0,9.0,2)
     22            CALL PLOT(0.0,0.0,3)
     23            CALL PLOT(10.0,0.0,2)
     24            X=0.0
     25            DO 1 I=1,9
     26            Y=FLOAT(I)
     27            VAL=Y*200.
     28            CALL SYMBOL(X,Y,.07,03,0.0,-1)
     29            CALL NUMBER((X-.105),(Y-.105),.07,VAL,90.0,-1)
     30        1   CONTINUE
     31            CALL SYMBOL((X-.5),4.0,.07,18HENERGY (*1000 MWH),90.0,+18)
     32            Y=0.0
     33            DO 2 I=1,10
     34            X=FLOAT(I)
     35            VAL=X*10.0
     36            CALL SYMBOL(X,Y,.07,03,0.0,-1)
     37            CALL NUMBER((X-.07),(Y-.15),.07,VAL,0.0,-1)
     38        2   CONTINUE
     39            CALL SYMBOL(4.75,(Y-.5),.07,15HPERCENT OF TIME,0.0,+15)
     40            CALL SYMBOL(999.,999.,.07,21H EQUALLED OR EXCEEDED,0.0,+21)
     41            NK=-K
     42            E(K+1)=0.0
     43            E(K+2)=200000.0
     44            PER(K+1)=0.0
     45            PER(K+2)=10.0
     46            CALL FLINE(PER,E,NK,1,0,0)
     47            CALL PLOT(16.0,-2.345,-3)
     48            RETURN
     49            END
```

```
@HDG  ****** SUBSCHEME/ ******

@PRT,S  HSTG4*NIAG1.SUBSCHEME/
FURFUR 20P1.M2.6 E35 S7*T)) 05/28/81 16:06:57
```

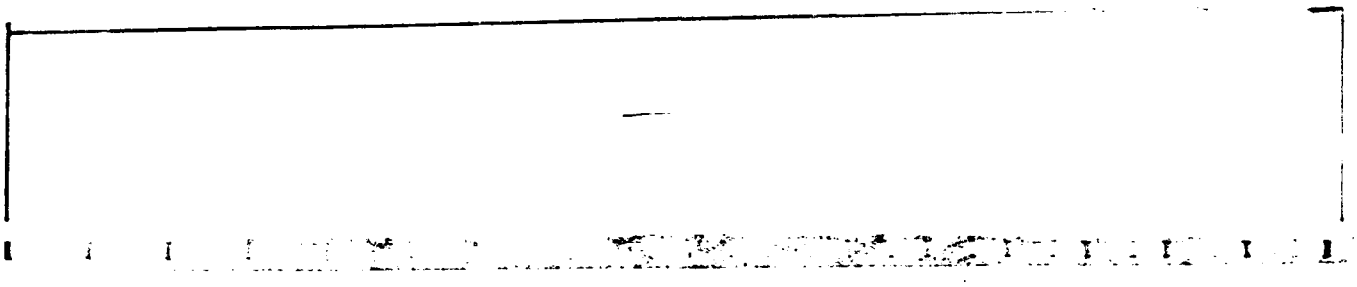
```
HSTG4*NIAG1(1).SUBSCHEME(21)
      1            SUBROUTINE SCHEME(ZRQ,ISCH,QI,J,ITIME,XRQ)
      2      C     ADJUSTS L. ERIE BASE OUTFLOW ZRQ FOR L. ERIE REG STUDY
      3      C     ADJUSTMENTS MADE FROM DISCHARGE INCREMENT QI TAKEN FROM SUBROUTINE 'ADJUST'
      4      C     ADJUSTMENT MADE TO BRING ZRQ TO APPROPRIATE VALUE
      5      C     CORRESPONDING TO CANADIAN TREATY HOURS
      6      C     ISCH IDENTIFIES WHICH SCHEME IS RUN
      7      C     ISCH=-1 FOR SE01552
      8      C     ISCH=0 FOR SE06L
      9      C     ISCH=1 FOR N25 AND BASE CASE
     10      C     ISCH =2 FOR ALL DIVERSION AND CONSUMPTIVE USES RUNS
     11            IF(QI.EQ.0.0)GO TO 99
     12            IF(ISCH)50,60,69
     13      50    IF(ITIME.EQ.0)GO TO 80
     14            XRQ=ZRQ+QI
     15            IF(J.GE.6.AND.J.LE.8)XRQ=ZRQ+(QI*0.8)
     16            IF(J.EQ.4)XRQ=(ZRQ+QI+QI/5+ZRQ+QI)/2
     17            IF(J.EQ.5)XRQ=ZRQ+QI+QI/5
     18            IF(J.EQ.11)XRQ=ZRQ+QI+QI/2
     19            IF(J.EQ.12)XRQ=(2*ZRQ+5*QI/2)/2
     20            IF(J.EQ.9)XRQ=ZRQ+QI+QI/11
     21            GO TO 99
     22      60    XRQ=ZRQ
     23            IF(J.GE.1.AND.J.LE.7)XRQ=ZRQ+QI
     24            IF(J.EQ.4.OR.J.EQ.12)XRQ=(ZRQ*2+QI)/2
     25            GO TO 99
     26      60    IF(ITIME.EQ.0)GO TO 90
     27            XRQ=ZRQ+QI
     28            IF(J.EQ.3)XRQ=(2*ZRQ+QI)/2
     29            IF(J.EQ.4)XRQ=(ZRQ*2+QI+QI/5)/2
     30            IF(J.EQ.5)XRQ=ZRQ+QI+QI/5
     31            IF(J.EQ.9)XRQ=ZRQ+QI+QI/11
     32            IF(J.EQ.11)XRQ=ZRQ+QI+QI/2
     33            IF(J.EQ.12)XRQ=(2*ZRQ+5*QI/2)/2
     34            IF(J.GE.6.AND.J.LE.8)XRQ=ZRQ+(QI*0.8)
     35            GO TO 99
     36      90    XRQ=ZRQ
     37            IF(J.EQ.1.OR.J.EQ.2)XRQ=ZRQ+QI
     38            IF(J.EQ.3.OR.J.EQ.12)XRQ=(ZRQ+(ZRQ+QI))/2
     39            GO TO 99
     40      89    XRQ=ZRQ
     41      99    RETURN
     42            END
```



```
@HDG  ****** SUBPGS/ ******

@PRT,S  HSTG4*NIAG1.SUBPGS/
FURPUR 26R1.M2.6 C35 S74T11 05/28/81 16:06:58
```

```
HSTG4*NIAG1(1).SUBPGS(4)
      SUBROUTINE PGS(AVMW,ADJMW)
C   CALCULATION OF PGS LOSS IN AVG. MW.
C       AVMW=AV.MW. INPUT
C       ADJMW=PGS LOSS
      DIMENSION C(6)
      DATA C0,(C(I),I=1,6)/-0.1671536,0.5288927,-0.5037727,
     10.2435965,-0.5849167E-01,0.7305895E-02,-0.3621186E-03/
      X=(AVMW-900.)/100.
      A=0.0
      DO 1 I=1,6
    1 A=(A+C(7-I))*X
      A=C0+A
      ADJMW=20.+20.*A
      RETURN
      END

@HDG ****** ADJUST/ ******

@PRT,S  HSTG4*NIAG1.ADJUST/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 16:06:59
```

```
HSTG4*NIAG1(1).ADJUST(11)
      SUBROUTINE SUBADJ(QERIE,ERIES,J,ISCH,QBASE,QINC,AST)
C     DETERMINES BASE FLOW QBASE
C     FLOW INCREMENT QINC AND FLAGS WITH '*'
C     IF TRIGGER ON CONDITION IN L. ERIE OUTFLOW QERIE
C     ISCH DETERMINES SCHEME AS DESCRIBED UNDER SUBROUTINE 'SCHEME'
C     BASE FLOW FORMULA SUPPLIED BY U. S. CORPS OF ENGINEERS
      DIMENSION RIN(12),DIFS(12),DIFL(12)
      DATA (RIN(K),K=1,12)/4.0,4.7,3.4,4.9,0.0,1.5,5.1,3.9,2.6,
     11.6,0.4,0.0/
      DATA (DIFL(K),K=1,12)/6800.,6800.,3400.,1700.,3400.,2300.,2300.,
     12300.,3400.,3400.,3400.,5100./
      DATA (DIFS(K),K=1,12)/15300.,15300.,15300.,11500.,7700.,
     15100.,5100.,5100.,7700.,7700.,7700.,11500./
      QBASE=((ERIES-556.25)**1.5*3.665-RIN(J)+7.)*1000.
      DIF=QERIE-QBASE
C     WRITE(6,52)DIF,ISCH
      IF(DIF.LE.1000.OR.ISCH.EQ.1)GO TO 10
      IF(ISCH.EQ.2)GO TO 10
      IF(ISCH.EQ.-1)GO TO 20
      QINC=6800.
      QBASE=QERIE-DIFL(J)
C     WRITE(6,52)QBASE,QINC,DIFL(J),QERIE
      AST='*'
      GO TO 99
10    QBASE=QERIE
      QINC=0.
      AST=' '
      GO TO 99
20    QINC=15300.
      QBASE=QERIE-DIFS(J)
      AST='*'
C     WRITE(6,52)QBASE
C     FORMAT()
99    RETURN
      END

@HDG  ****** MAPLOAD/          ******

@PRT,S  HSTG4*NIAG1.MAPLOAD/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 16:06:59
```



```
****** MAPLOAD/              ******                                                    DATE 052881        PAGE    24

HSTG4*NIAG1(1).MAPLOAD(71)
      @MAP,I ,NIAG1.LOAD
      LIB   SYS$*PLIB$ (IMAIN/$ODD,DMAIN/$EVEN)
      DBANK,CM  DMAIN,017000
      IN SYS$HYDRO*LIB.GETDAY
      IN NIAG1.LOAD
      IN NIAG1.SUBMONTH
      IN NIAG1.MWLZJ2
      IN NIAG1.SUBPEAK
      IN NIAG1.SUBDUR
      IN NIAG1.SUBTOTAL
      IN NIAG1.MWLZW1
      IN NIAG1.SUBSCHEME
      IN NIAG1.ADJUST
      IN NIAG1.SUBPGS
      IN NIAG1.SUBPOND
      IN NIAG1.SUBBHW
      IN NIAG1.SUBCAS
      IN NIAG1.SUBDEC
      IN BLANK$COMMON
      IBANK,M  IMAIN,01000
      FORM   DMAIN
      END

@HDG  ****** SUBDEC/              ******

@PRT,S  HSTG4*NIAG1.SUBDEC/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 16:07:00
```

```
****** SUBDEC/              ******                                                    DATE 052881        PAGE    25

HSTG4*NIAG1(1).SUBDEC(24)
                SUBROUTINE QDEC(RLE,MON,DQ)
        C       CALCULATION OF DISCHARGE FOR DECEW
        C       BASED ON LAKE ERIE ELEVATION AND MONTH
        C        DIVERSION=7000 CFS
                DIMENSION C(7),DQMAX(12)
                DATA CO,(C(I),I=1,7)/-0.1262018E+04,0.1575734E+04,-0.8390866E+03,
               10.2454287E+03,-0.4245535E+02,0.4345007E+01,-0.2438443,
               10.5795483E-02/
                DATA (DQMAX(J),J=1,12)/6800.,6800.,6500.,4900.,3700.,
               13800.,3900.,3900.,4000.,3900.,4000.,6100/
                IF(MON.GE.4)GO TO 20
                DQ=(RLE-566.36)/3.111111E-04
                GO TO 30
        20      XLE=(RLE-566.0)/0.505
                DQ=0
                DO 1 I=1,7
        1       DQ=(DQ+C(8-I))*XLE
                DQ=(DQ+CO)*505.0
        30      IF(DQ.GT.DQMAX(MON))DQ=DQMAX(MON)
                IF(DQ.LT.0.0)DQ=0.0
                RETURN
                END

@HDG  ****** LOAD/              ******

@PRT,S  HSTG4*NIAG1.LOAD/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 16:07:01
```

-96-

```
HSTC4*NIAG1(1).LOAD(35)
      1            COMPILER (YM=1)
      2      C     *** NIAGARA ENERGY PROGRAMME ***
      3      C     MAIN EXECUTABLE PROGRAMME
      4      C      INPUT DATA FILE CONSISTS OF:
      5      C      LINE 1: STU: STUDY NAME, NO1: STUDY NUMBER,
      6      C                NO2: SECOND PART OF STUDY NO.(MAX. 6 ALPHANUMERIC CHARACTERS)
      7      C      LINE2: REPORT #,ITW=0-NO L. ONT. ELEV.,ITW=1-READ L.ONT.ELEV.
      8      C        PLOT NUMBER,1=NO PLOT,0=ACTIVATE PLOT.
      9      C      START MONTH,END MONTH,SCHEME FLAG, CAN/US FLOW DIVERSION CONSTANT
     10      C      LINE 3: DISCHARGE FALLS DAYTIME (12 VALUES)
     11      C    LINE 4: DISCHARGE FALLS NIGHTIME (12 VALUES)
     12      C    LINE 5: LAKE ERIE ADJUSTMENTS (12 VALUES)
     13      C    LINE 6: MATERIAL DOCK ELEVATIONS (12 VALUES)
     14      C    LINE 7: TO END: YEAR/MONTH,ELEVATIONS (FT.),DISCHARGE (1000'S CFS.)
     15      C      OUTPUT BASED ON 7 REPORT TABLES
     16      C      REPORT 1: A)FLOWN TABLE SUMMARY
     17      C                B)PLANT ENERGY (MWH) TABLE SUMMARY
     18      C      REPORT 2: 1.A) PLUS B)PEAK PROGRAM CALL
     19      C     LAKE ERIE REGULATION STUDY AND DIVERSION AND CONSUMPTIVE
     20      C     USES STUDY ARE ALL REPORT 2 OUTPUTS
     21      C      REPORT 3: 1.A) PLUS B)ANNUAL TOTAL DURATION
     22      C                C)DURATION BY STATION BY MONTH
     23      C      REPORT 4: 1.A),1.B) - US C)MONTHLY DAYTIME DURATION
     24      C                D)MONTHLY NIGHTIME DURATION
     25      C                E)MONTHLY TOTAL DURATION
     26      C                F)ANNUAL DAYTIME TOTAL DURATION
     27      C                G)ANNUAL NIGHTIME TOTAL DURATION
     28      C                H)ANNUAL TOTAL DURATION
     29      C      REPORT 5: 1.A) PLUS B)STS ENERGY DATA FILE DUMP PLUS 3.C)
     30      C      REPORT 6: A)OVERALL MONTHLY FLOW DURATION STUDY
     31      C                B)FLOW DURATION BY MONTHS
     32      C                C)TOURIST SEASON FLOW DURATION
     33      C                D)NON-TOURIST FLOW DURATION
     34      C      REPORT 7: A)LAKE ERIE ELEV. DURATION BY MONTHS
     35      C                B)OVERALL ELEV. DURATION
     36      C                C)NAVIGATION SEASON ELEV. DURATION
     37            DIMENSION EAD(100,12),EOPD(100,12),FCNPD(100,12),ETOTD(100,12)
     38            DIMENSION EAN(100,12),EOPN(100,12),FCNPN(100,12),ETOTN(100,12)
     39            DIMENSION EDD(100,12),EDN(100,12),ETOTM(100,12),TITL(2),AM(2)
     40            DIMENSION RQ(100,12),FMD(12),US(1200)
     41            DIMENSION IDATE(2),FTOTY(100),IY(100),ADJ(12)
     42            DIMENSION RELE(100,12),ETOTYD(100),ETOTYN(100)
     43            DIMENSION QFN(12),ASTER(100,12),HASTER(100),IHD6(4)
     44            DIMENSION END1(100,12),ENA1(100,12),ENOP1(100,12),ENCN1(100,12)
     45            DIMENSION CTOT(100,12),QFD(12),XLER(100,12)
     46            DIMENSION QSIP(100,12)
     47            DIMENSION RELET(1200),IYT(1200),RNAV(1200),IYNAV(1200),
     48           1RNON(1200),IYNON(1200)
     49            DIMENSION RQT(1200),ELVONT(100,12),EOPHD(100,12),EOPHN(100,12),
     50           1RQTP(1200),IYRQTR(1200),RCNTR(1200),IYRCNT(1200)
     51            DIMENSION M1(1200),M2(1200),M3(1200),M4(1200),M5(1200)
     52            COMMON QBAC(100,12),QBECK(100,12),DIVDEC(100,12),
     53           1POP(100,12),PCNP(100,12),PDEC(100,12),PRK(100,12),
     54           1PTOT(100,12),PTOTA(100,12),P(1200),S(1200),MOR(1200)
     55            COMMON MM(12,100,3)
     56            CALL GETDAY(IDATE)
```

```
      LP=1
      IX=0
      INON=0
      INAV=0
      ITR=0
      INTP=0
      IFLAG=0
      PD=0.
      PN=0.
C     READ DATA FILE PARAMETERS
      READ(5,711)IHDG
  711 FORMAT(1X,A4)
      READ(5,500) IR,ITW,IP,MS,MF,ISCH,VARI
      READ(5,500)(QFD(I),I=1,12)
      READ(5,500)(QFN(I),I=1,12)
      READ(5,500)(ADJ(I),I=1,12)
      READ(5,500) (EMD(I),I=1,12)
      Z1='      '
      Z2='      '
      IF(IR.EQ.0.OR.IR.GT.7) GO TO 28
      GO TO 29
   28 IR=1
      Z2='RESET '
   29 IF(IP.EQ.0.OR.IP.GT.5) GO TO 36
      GO TO 37
   36 IP=1
      Z2='RESET '
C     WRITE INITIAL TITLES & DATA BLOCK
   37 WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,211)IR,Z1,IP,Z2,(QFD(N),N=1,12),(QFN(N),N=1,12),
     1(ADJ(N),N=1,12),(EMD(N),N=1,12)
      LP=LP+1
      NOY=0
   15 NOY=NOY+1
      READ(5,100,END=99) IY(NOY),MON1,(PELE(NOY,J),RQ(NOY,J),J=MON1,6)
C     WRITE(6,500) IY(NOY),MON1,(RQ(NOY,J),J=MON1,6)
      READ(5,100) IY(NOY),MON2,(RELE(NOY,J),RQ(NOY,J),J=MON2,12)
C     WRITE(6,500) IY(NOY),MON2,(RQ(NOY,J),J=MON2,12)
      GO TO 15
   99 NOY=NOY-1
      MON1=1
      IF(ITW.EQ.0)GO TO 947
      DO 946 I=1,NOY
  946 READ(10,322,END=947)(ELVONT(I,J),J=1,12)
C     WRITE(6,500)((I,J,NOY,ELVONT(I,J),J=1,12),I=1,NOY)
  947 IYS=IY(1)
      IYEAR1=IYS+1900
      IYF=IY(NOY)
C     CALCULATE FLOWS AND AV. MW. FOR EACH STATION
      DO 20 I=1,NOY
      WRITE(6,220)IHDG,IDATE,LP
      LP=LP+1
      WRITE(6,200)
      DO 21 J=MS,MF
      RQ(I,J)=RQ(I,J)*10.
      QIIN=RQ(I,J)
      XLER(I,J)=RQ(I,J)
```

```
      ERIES=RELE(I,J)
      CALL SUMADJ(QTIB,PRTES,J,ISCH,BASE,XINC,ASTEN(I,J))
      ITIME=1
C     SETS UP DAYTIME/NIGHTIME ROUTINE,ITIME=0 FOR DAY,1 FOR NIGHT
14    CALL SCHEME(BASE,ISCH,XINC,J,ITIME,ORES)
      RO(I,J)=ORES
      IF(ITIME.EQ.0) TIME='D'
      IF(ITIME.EQ.1) TIME='N'
      IF(J.LT.4.OR.J.GT.10) GO TO 5
      TOUR=' T'
      GO TO 6
5     TOUR='NT'
C     WRITE(6,4)J,TOUR
C     FORMAT(10X,I2,5X,A2)
6      IYEAR=IY(I)
      CALL QDEC(RELE(I,J),J,DEC)
      DISPEC(I,J)=DEC
      CALL MONTH(J,IYEAR,MO,AM)
      QGIP(I,J)=RO(I,J)-ADJ(J)-DEC
      QLCA=RO(I,J)-ADJ(J)
      IF(ITIME.EQ.0) QF=QFD(J)
      IF(ITIME.EQ.1) QF=QFN(J)
      QP=PO(I,J)-QF-ADJ(J)
      QCA=(QP/2.0)+VAPI/2.
      QUS=(QP/2.0)-VAPI/2.
      IF(QUS.GT.102000.)QUS=102000.
C     WRITE(6,500) QCA,QUS,QP
      IF(J.LT.4.OR.J.GT.10) GO TO 10
      IF(ITIME.EQ.0) QCA=QCA+PD
10    QRC=QCA-DEC
      IF(ITIME.EQ.0)QRAC(I,J)=QBC
      CALL PHW(QBC,EMD(J),J,QB,HW)
      QC=QBC-QB
      TW=245.
      IF(ITW.EQ.1)TW=ELVONT(I,J)
      QT=QCA+QUS+QF
C     WRITE(6,500) QT,QCA,QUS,QF
C     QT=QGIP
2     TW=TW+.1
      IF(ITW.EQ.0)Q=(((((TW+244.5)/2)-225.256)
     1*(SQRT(TW-244.5)))/.00020164
      IF(ITW.EQ.1)Q=(((((TW+ELVONT(I,J))/2)-225.256)*
     1(SQRT(TW-ELVONT(I,J))))/.00020164
C     WRITE(6,500) TW,QT,Q
      IF(TW.GT.254.) WRITE(6,303) TW
      IF(TW.GT.254.) GO TO 999
      IF(Q.LT.QT) GO TO 3
      QUP=Q
      GO TO 7
3     QLOW=Q
      TWL=TW
      GO TO 2
7     TW=TWL+((0.1/(QUP-QLOW))*(QT-QLOW))
C     WRITE(6,500) QUP,QT,QLOW,TWL
      HB=HW-TW
      CALL  CAS(QC,J,ENDR,ITIME,QB,QBA,QOP,QCNP)
      IF(ITIME.EQ.0)QPECK(I,J)=QBA
```

```
      IF(QBA.EQ.QB) GO TO 9
      CALL RNW(QBA,FND(J),J,J9,HBA)
      HB=HBA-TW
    9 IF(QCNP.GT.9900.0)QCNP=9900.0
      IF(J.LT.4.OR.J.GT.10.OR.ITIME.EQ.0.OR.IFLAG.EQ.1)GO TO 810
      CALL POND(QOP,QCA,PD,PN,IFLAG)
      GO TO 10
  810 IF(J.LT.4.AND.QCNP.GT.1000.)QCNP=1000.
      IFLAG=0
   10 IF(ITIME.EQ.1) GO TO 15
      EDD(I,J)=(131./6430.)*DEC
      EBD(I,J)=(((22./291.)*HB)*QBA)/1000
      EOPD(I,J)=(QOP*12.6)/1000
      ECNPD(I,J)=(QCNP*7.6)/1000
      ETOTD(I,J)=EBD(I,J)+EOPD(I,J)+ECNPD(I,J)+EDD(I,J)
C      OUTPUT FLOWS & AVE. Mw. FOR DAYTIME HOURS
      WRITE(6,201)IY(I),AM(I),TOUR,TIME,RQ(I,J),QLEA,QGIP(I,J),
     1QCA,GUS,DEC,QBC,QBA,QOP,QCNP,EDD(I,J),EBD(I,J),EOPD(I,J),
     1ECNPD(I,J),ETOTD(I,J)
      WRITE(6,502)
      GO TO 820
   15 EDN(I,J)=(131./6430.)*DEC
      EBN(I,J)=(((22./291.)*HB)*QBA)/1000
      EOPN(I,J)=(QOP*12.6)/1000
      ECNPN(I,J)=(QCNP*7.6)/1000
      ETOTN(I,J)=EBN(I,J)+EOPN(I,J)+ECNPN(I,J)+EDN(I,J)
C      OUTPUT FLOWS & AVE. Mw. FOR NIGHTIME HOURS
      WRITE(6,201)IY(I),AM(I),TOUR,TIME,RQ(I,J),QLEA,QGIP(I,J),
     1QCA,GUS,DEC,QBC,QBA,QOP,QCNP,EDN(I,J),EBN(I,J),EOPN(I,J),
     1ECNPN(I,J),ETOTN(I,J)
      ITIME=0
      GO TO 14
  820 IF(IR.LT.6)GO TO 21
C      SET UP PARAMETERS FOR FLOW & ELEVATION DURATION REPORTS
      IX=IX+1
      RELET(IX)=RELE(I,J)
      RGT(IX)=XLER(I,J)
      MI(IX)=J
      IYT(IX)=IY(I)
      IF(J.GE.4)GO TO 640
      INON=INON+1
      RNON(INON)=RELE(I,J)
      M2(INON)=J
      IYNON(INON)=IY(I)
      GO TO 671
  640 INAV=INAV+1
      RNAV(INAV)=RELE(I,J)
      M3(INAV)=J
      IYNAV(INAV)=IY(I)
  671 IF(J.LT.4.OR.J.GT.10)GO TO 670
      ITR=ITR+1
      RGTR(ITR)=XLER(I,J)
      M4(ITR)=J
      IYRQTR(ITR)=IY(I)
      GO TO 21
  670 INTR=INTR+1
      RGNTR(INTR)=XLER(I,J)
```

```
      MS(INTR)=J
      IYRONT(INTR)=IY(I)
   21 CONTINUE
      IMS=1
   20 CONTINUE
      IF(IR.EQ.6)GO TO 551
      IF(IR.EQ.7)GO TO 950
C          **********************
C          ENERGY CALCULATIONS
C          **********************
      IMS=MS
      DO 30 I=1,NOY
      GO TO (24,23,23,24,23,24,23),IR
   24 WRITE(6,220)IMOO,IDATE,LP
      LP=LP+1
      WRITE(6,203)
   23 DO 31 J=MS,MF
      IYEAR=I
      CALL MONTH(J,IYEAR,MD,AM)
      IF(J.LT.4.OR.J.GT.10)GO TO 32
      IF(J.EQ.9)GO TO 33
      IF(J.EQ.10)GO TO 34
      F1=14.
      F2=2.
      F3=8.
      GO TO 35
   32 F1=16.
      F2=0.
      F3=8.
      GO TO 35
   33 F1=13.
      F2=3.
      F3=8.
      GO TO 35
   34 F1=12.
      F2=4.
      F3=8.
   35 EPD(I,J)=((F1*EDD(I,J))+(F2*EDN(I,J)))*MD
      EDN(I,J)=F3*EDN(I,J)*MD
      EPD(I,J)=((F1*EBD(I,J))+(F2*EBN(I,J)))*MD
      EBN(I,J)=F3*EBN(I,J)*MD
      EOPD(I,J)=((F1*EOPD(I,J))+(F2*EOPN(I,J)))*MD
      EOPN(I,J)=F3*EOPN(I,J)*MD
      ECNPD(I,J)=((F1*ECNPD(I,J))+(F2*ECNPN(I,J)))*MD
      ECNP(I,J)=F3*ECNPN(I,J)*MD
      ETOTD(I,J)=EDD(I,J)+EBD(I,J)+EOPD(I,J)+ECNPD(I,J)
      ETOTN(I,J)=EDN(I,J)+EBN(I,J)+EOPN(I,J)+ECNPN(I,J)
      DMWH=ETOTD(I,J)/MD
      EMWH=ETOTN(I,J)/MD
      CALL PGSI(DMWH,EMWH,QGIP(I,J),J)
      EOPHD(I,J)=DMWH/16.
      EOPHN(I,J)=EMWH/8.
      ETOTH(I,J)=(DMWH+EMWH)*MD
      ETOTYD(I)=ETOTYD(I)+DMWH*MD
      ETOTYN(I)=ETOTYN(I)+EMWH*MD
      ETOTY(I)=ETOTY(I)+ETOTH(I,J)
      END1(I,J)=(EDD(I,J)+EDN(I,J))/(MD*24.)
```

```
      ENB1(I,J)=(EGD(I,J)+EBK(I,J))/(MD*24.)
      CALL POS(ENB1(I,J),XLOSS)
      ENB1(I,J)=ENB1(I,J)-XLOSS
      ENOP1(I,J)=(EOPD(I,J)+EOPN(I,J))/(MD*24.)
      ENCN1(I,J)=(ECNPD(I,J)+ECNPN(I,J))/(MD*24.)
      ETOT1(I,J)=ENB1(I,J)+END1(I,J)+ENOP1(I,J)+ENCN1(I,J)-75.24
      GO TO (18,31,31,18,715,18,31),IP
   18 WRITE(6,206) IY(I),AM(I),EDD(I,J),ERD(I,J),EOPD(I,J),ECNPD(I,J),
     1ETOTD(I,J)
      WRITE(6,204) IY(I),AM(I),EDN(I,J),ERN(I,J),EOPN(I,J),ECNPN(I,J),
     1ETOTN(I,J),ETOTM(I,J)
      WRITE(6,502)
      GO TO 31
  715 CALL PEAK(NOY,MS,MF)
      WRITE(15,710)IY(I),J,END1(I,J)
      WRITE(16,710)IY(I),J,ENB1(I,J)
      WRITE(17,710)IY(I),J,ENOP1(I,J)
      WRITE(18,710)IY(I),J,ENCN1(I,J)
      WRITE(19,710)IY(I),J,ETOT1(I,J)
      WRITE(20,710)IY(I),J,POP(I,J)
      WRITE(21,710)IY(I),J,PCNP(I,J)
      WRITE(22,710)IY(I),J,PBK(I,J)
      WRITE(23,710)IY(I),J,PDEC(I,J)
      WRITE(24,710)IY(I),J,PTOTA(I,J)
   31 CONTINUE
      IMS=1
   30 CONTINUE
      IF(IR.EQ.6.OR.IR.EQ.2)GO TO 551
      GO TO 713
C     ***********************************************
C       MONTHLY TOTAL FLOW DURATION
C     ***********************************************
  551 DO 552 J=MS,MF
      I=0
      DO 553 M=1,NOY
      I=I+1
      US(I)=XLEP(M,J)
      MASTER(I)=ASTER(I,J)
  553 CONTINUE
      N5=1
      N9=I
      CALL DUR(US,I,IYS,N9,NS,VAL,VALS)
      TITL(1)=' MONTH'
      TITL(2)='LY    '
      LC=99
      ACV=0.0
      CALL MONTH(J,0,MD,AM)
      DO 554 M=1,I
      LC=LC+1
      IF(LC.LE.42)GO TO 511
      WRITE(6,220)IMDG,IDATE,LP
      WRITE(6,556)(TITL(N),N=1,2),(AM(N),N=1,2)
      LP=LP+1
      LC=0
  511 N=MON(K)
      ACV=ACV+XLEP(N,J)
      WRITE(6,333)IY(N),S(K),MASTER(N),ACV,P(K)
```

```
      550   CONTINUE
      552   CONTINUE
            WRITE(6,220)IHDG,IDATE,LP
            WRITE(6,321)
      556   FORMAT(15X,'DURATION LISTING OF',2A6,' OVERALL'
           1' DISCHARGE (CFS) FOR ',2A6,///,
           12X,'YEAR          DISCHARGE    ACCUMULATED      PERCENT',
           1' OF TIME',/,18X,'(CFS)',9X,'VALUE',7X,
           1'EQUALLED OR EXCEEDED',/,2X,'----',10X,9('-'),4X,
           111('-'),7X,20('-'),//)
      321   FORMAT(1H1,'***MONTHLY TOTAL FLOW DURATION COMPLETED***')
            IF(IN.EQ.2)GO TO 713
      C      *******OVERALL FLOW DURATION*******
            N5=1
            N9=1
            CALL DUR(ROT,IX,IYS,N9,N5,VAL,VAL5)
            AM(1)='  OVER'
            AM(2)='ALL   '
            LC=50
            ACV=0.0
            DO 692 L=1,IX
            LC=LC+1
            IF(LC.LE.42)GO TO 772
            WRITE(6,220)IHDG,IDATE,LP
            WRITE(6,672)(AM(N),N=1,2)
            LP=LP+1
            LC=0
      772   N=MOR(L)
            ACV=ACV+ROT(N)
            WRITE(6,696)IYT(N),M1(N),S(L),ACV,P(L)
      692   CONTINUE
            WRITE(6,220)IHDG,IDATE,LP
            WRITE(6,673)
            LP=LP+1
            IF(IN.EQ.2)GO TO 713
      C      ********TOURIST SEASON FLOW DURATION********
            N5=1
            N9=1
            CALL DUR(ROTR,ITR,IYS,N9,N5,VAL,VAL5)
            AM(1)='  TOUR'
            AM(2)='IST   '
            LC=50
            ACV=0.0
            DO 680 K=1,ITR
            LC=LC+1
            IF(LC.LE.42)GO TO 681
            WRITE(6,220)IHDG,IDATE,LP
            WRITE(6,672)(AM(N),N=1,2)
            LP=LP+1
            LC=0
      681   N=MOR(K)
            ACV=ACV+ROTR(N)
            WRITE(6,696)IYROTR(N),M1(N),S(K),ACV,P(K)
      680   CONTINUE
            WRITE(6,220)IHDG,IDATE,LP
            WRITE(6,683)
            LP=LP+1
```

-103-

```
      C     **********NON-TOURIST SEASON FLOW DURATION****
            NS=1
            NF=1
            CALL DUR(FONTR,INTR,IYS,N9,NS,VAL,VALS)
            AM(1)='NON-TO'
            AM(2)='URIST '
            LC=50
            ACV=0.0
            DO 690 K=1,INTR
            LC=LC+1
            IF(LC.LE.42)GO TO 691
            WRITE(6,220)INDG,IDATE,LP
            WRITE(6,672)(AM(N),N=1,2)
            LP=LP+1
            LC=0
      691   N=MON(K)
            ACV=ACV+RCNTR(N)
            WRITE(6,696)IYRONT(N),MS(N),S(K),ACV,P(K)
      690   CONTINUE
            WRITE(6,220)INDG,IDATE,LP
            WRITE(6,693)
            LP=LP+1
            IF(IR.EQ.6)GO TO 999
      C     IF(IP.NE.1) CALL PLOTS(DUM1,DUM2,15)
      713   GO TO (999,388,72,70,370,70,370),IR
      C      ********************************
      C      PEAK CALCULATIONS AND REPORT
      C      ********************************
      888   CALL PEAK(NOY,MS,MF)
            LC=39
            DO 601 I=1,NOY
            IYEAR=IY(I)
            DO 602 J=MS,MF
            LC=LC+1
            CALL MONTH(J,IYEAR,MD,AM)
            IF(LC.GE.40)GO TO 603
            GO TO 604
      603   WRITE(6,220)INDG,IDATE,LP
            WRITE(6,608)
            LC=0
            LP=LP+1
      604   WRITE(6,606)IY(I),AM(1),POP(I,J),PCNP(I,J),PDEC(I,J),
           1PPK(I,J),PTOT(I,J),PTOTA(I,J)
      602   CONTINUE
      601   CONTINUE
            WRITE(6,220)INDG,IDATE,LP
            LP=LP+1
      C           ******************************
      C           MONTHLY  DURATION FOR PEAK
      C           ******************************
            DO 580 J=MS,MF
            I=0
            DO 541 M=1,NOY
            I=I+1
            US(I)=PTOT(M,J)
      541    CONTINUE
            NS=1
```

```
      N9=1
      CALL DUR(US,I,IYS,N9,NS,VAL,VALS)
      TITL(1)='  OVER'
      TITL(2)='ALL'
      LC=50
      ACV=0.0
      CALL MONTH(J,0,MO,AM)
      DO 542 K=1,I
      LC=LC+1
      IF(LC.LE.42) GO TO 543
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,521) (TITL(N),N=1,2),(AM(N),N=1,2)
      LP=LP+1
      LC=0
  543 M=MOR(K)
      ACV=ACV+PTOT(M,J)
      WRITE(6,208) IY(M),S(K),ACV,P(K)
  542 CONTINUE
C     GO TO (61,73,61,61,73),IP
C     CALL OURPLT(S,P,1,TITL,AM,IYS,IYF)
  540 CONTINUE
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,301)
      LP=LP+1
      WRITE(6,607)
      IF(IR.EQ.2)GO TO 70
      GO TO 599
  606 FORMAT(1X,'19',I2,1X,A3,1X,5F14.2,F18.2)
  608 FORMAT(38X,'NIAGARA AREA (ONTARIO)',/,38X,22('-'),///,
     1' YEAR/MONTH',4X,'O.P. PEAK',5X,'CNP. PEAK',4X,'DECEW PEAK',
     15X,'BECK PEAK',9X,'TOTAL',4X,'ADJUSTED TOTAL',/,17X,'(MW)',
     11CX,'(MW)',10X,'(MW)',10X,'(MW)',13X,'(MW)',3X,'(TOTAL-75MW)',
     1/,10('-'),5X,9('-'),5X,9('-'),4X,10('-'),5X,9('-'),9X,5('-'),
     114X,15('-'),//)
  607 FORMAT('*** PEAK PROGRAM COMPLETED****')
C          ****************************
C          MONTHLY   DAYTIME DURATION FOR ENERGY
C          ****************************
   70 DO 61 J=MS,MF
      I=0
      DO 62 M=1,NOY
      I=I+1
      US(I)=EOPHD(M,J)
   62 CONTINUE
      NS=1
      N9=1
      CALL DUR(US,I,IYS,N9,NS,VAL,VALS)
      TITL(1)='  DAYT'
      TITL(2)='IME'
      LC=50
      ACV=0.0
      CALL MONTH(J,0,MO,AM)
      DO 51 K=1,I
      LC=LC+1
      IF(LC.LE.42) GO TO 50
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,207) (TITL(N),N=1,2),(AM(N),N=1,2)
```

-501-

```
      LP=LP+1
      LC=0
   50 N=MON(K)
      ACV=ACV+EOPHO(N,J)
      WRITE(6,208) IY(N),S(K),ACV,P(K)
   51 CONTINUE
C     GO TO (61,73,61,61,73),IP
C     CALL DURPLT(S,P,I,TITL,AM,IYS,IYF)
   61 CONTINUE
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,301)
      LP=LP+1
C          ****************************
C          MONTHLY NIGHTTIME DURATION
C          ****************************
      DO 63 J=MS,MF
      I=0
      DO 64 M=1,NOY
      I=I+1
      US(I)=EOPHN(M,J)
   64 CONTINUE
      NS=1
      N9=1
      CALL DUR(US,I,IYS,N9,NS,VAL,VALS)
      TITL(1)='NIGHTT'
      TITL(2)='IME'
      LC=66
      ACV=0.0
      CALL MONTH(J,0,MD,AM)
      DO 52 K=1,I
      LC=LC+1
      IF(LC.LE.42) GO TO 53
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,207) (TITL(N),N=1,2),(AM(N),N=1,2)
      LP=LP+1
      LC=0
   53 N=POR(K)
      ACV=ACV+EOPHN(N,J)
      WRITE(6,208) IY(N),S(K),ACV,P(K)
   52 CONTINUE
C     GO TO (53,74,63,63,74),IP
C     CALL DURPLT(S,P,I,TITL,AM,IYS,IYF)
   63 CONTINUE
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,302)
      LP=LP+1
      IF(IR.EQ.4.OR.IR.EQ.2) GO TO 71
      GO TO 999
C          **********************
C          MONTHLY TOTAL DURATION
C          **********************
   71 DO 65 J=MS,MF
      I=0
      DO 66 M=1,NOY
      I=I+1
      US(I)=EOPHO(M,J)+EOPHN(M,J)
   66 CONTINUE
```

```
      NS=1
      N9=1
      CALL DUR(US,I,IYS,N9,NS,VAL,VALS)
      TITL(1)=' MONTH'
      TITL(2)='LY '
      LC=50
      ACV1=0.0
      ACV2=0.0
      ACV3=0.0
      CALL MONTH(J,D,MD,AM)
      DO 54 K=1,I
      LC=LC+1
      IF(LC.LE.42) GO TO 55
      WRITE(6,220)IHOG,IDATE,LP
      WRITE(6,209) (TITL(N),N=1,2),(AM(N),N=1,2)
      LP=LP+1
      LC=0
   55 N=MOR(K)
      ACV1=ACV1+EOPHD(N,J)
      ACV2=ACV2+EOPHN(N,J)
      ACV3=ACV3+EOPHD(N,J)+EOPHN(N,J)
      WRITE(6,210) IY(N),EOPHD(N,J),ACV1,EOPHN(N,J),ACV2,S(K),ACV3,P(K)
   54 CONTINUE
C     GO TO (65,65,75,65,75),IP
C     CALL DURPLT(S,P,I,TITL,AM,IYS,IYF)
   65 CONTINUE
      WRITE(6,220)IHOG,IDATE,LP
      WRITE(6,300)
      LP=LP+1
      IF(IR.EQ.4.OR.IR.EQ.2) GO TO 390
      GO TO 999
C     ********************************
C     ANNUAL DAYTIME TOTAL DURATION
C     ********************************
  390 I=0
      DO 400 M=1,NOY
      I=I+1
      US(I)=ETOTYD(M)
  400 CONTINUE
      NS=1
      N9=1
      CALL DUR(US,I,IYS,N9,NS,VAL,VALS)
      TITL(1)='ANNUAL'
      TITL(2)='DAY'
      LC=50
      ACV=0.0
      DO 410 K=1,I
      LC=LC+1
      IF(LC.LE.42) GO TO 420
      WRITE(6,220)IHOG,IDATE,LP
      WRITE(6,250)(TITL(N),N=1,2)
      LP=LP+1
      LC=0
  420 N=MOR(K)
      ACV=ACV+ETOTYD(N)
      WRITE(6,208)IY(N),S(K),ACV,P(K)
  410 CONTINUE
```

```
627             AVG=ACV/I
628             WRITE(6,305)AVG
629       C     GO TO (530,430,430,440,440),IP
630       C     CALL OURPLT(S,P,I,TITL,AM,IYS,IYF)
631       430   WRITE(6,220)IHDG,IDATE,LP
632             WRITE(6,306)
633             LP=LP+1
634       C     **********************************
635       C     ANNUAL NIGHTTIME TOTAL DURATION
636       C     **********************************
637       490   I=0
638             DO 600 M=1,NOY
639             I=I+1
640             US(I)=ETOTYN(M)
641       600   CONTINUE
642             N5=1
643             N9=1
644             CALL DUR(US,I,IYS,N9,N5,VAL,VAL5)
645             TITL(1)='ANNUAL'
646             TITL(2)='NIGHT'
647             LC=50
648             ACV=0.0
649             DO 510 K=1,I
650             LC=LC+1
651             IF(LC.LE.42) GO TO 520
652             WRITE(6,220)IHDG,IDATE,LP
653             WRITE(6,250)(TITL(N),N=1,2)
654             LP=LP+1
655             LC=0
656       520   N=MON(K)
657             ACV=ACV+ETOTYN(N)
658             WRITE(6,208)IY(N),S(K),ACV,P(K)
659       510   CONTINUE
660             AVG=ACV/I
661             WRITE(6,307)AVG
662       C     GO TO (530,530,530,540,540),IP
663       C     CALL OURPLT(S,P,I,TITL,AM,IYS,IYF)
664       530   WRITE(6,220)IHDG,IDATE,LP
665             WRITE(6,308)
666             LP=LP+1
667       C           **********************
668       C           ANNUAL TOTAL DURATION
669       C           **********************
670       72     I=0
671             DO 67 M=1,NOY
672             I=I+1
673             US(I)=ETOTY(M)
674       67    CONTINUE
675             N5=1
676             N9=1
677             CALL DUR(US,I,IYS,N9,N5,VAL,VAL5)
678             TITL(1)='ANNUAL'
679             TITL(2)='      '
680             LC=50
681             ACV=0.0
682             DO 66 K=1,I
683             LC=LC+1
```

-901-

```
      IF(LC.LE.42) GO TO 56
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,250) (TITL(N),N=1,2)
      LP=LP+1
      LC=0
56    N=MON(K)
      ACV=ACV+ETOTY(N)
      WRITE(6,208) IY(N),S(K),ACV,P(K)
68    CONTINUE
      AVG=ACV/I
      WRITE(6,309) AVG
C     GO TO (77,77,77,76,76),IP
C     CALL DUPPLT(S,P,I,TITL,AM,IYS,IYF)
77    WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,304)
      LP=LP+1
      IF(IR.EQ.4.OR.IR.EQ.2) GO TO 999
      GO TO 370
C     ****************************************
C      DURATION BY STATION BY MONTH
C     ****************************************
370   N9=0
      N5=0
      DO 103 K=1,5
      DO 105 J=MS,MF
      I=0
      DO 110 N=1,NOY
      I=I+1
      GO TO (115,120,125,130,426),K
115   US(I)=END1(M,J)
      GO TO 110
120   US(I)=END1(M,J)
      GO TO 110
125   US(I)=ENOP1(M,J)
      GO TO 110
130   US(I)=ENCN1(M,J)
      GO TO 110
426   US(I)=ETOT1(M,J)
110   CONTINUE
      CALL DUP(US,I,IYS,N9,N5,VAL,VALSQ)
      TITL(1)=' MONTH'
      TITL(2)='LY    '
      LC=50
      ACV=0.0
      IY=0
      CALL MONTH(J,IYR,MD,AM)
      DO 135 L=1,I
      LC=LC+1
      IF(LC.LE.42)GO TO 161
      WRITE(6,220)IHDG,IDATE,LP
      GO TO (140,145,150,155,156),K
140   STA='DECEM'
      WRITE(6,320)(TITL(N),N=1,2),(AM(N),N=1,2),STA
      GO TO 160
145   STA='D+PGS'
      WRITE(6,320)(TITL(N),N=1,2),(AM(N),N=1,2),STA
      GO TO 160
```

-101-

```
      150   STA=' 0.F'
            WRITE(6,320)(TITL(N),N=1,2),(AM(N),N=1,2),STA
            GO TO 160
      155   STA=' CNP.'
            WRITE(6,320)(TITL(N),N=1,2),(AM(N),N=1,2),STA
            GO TO 160
      156   STA='ALL-75'
            WRITE(6,320)(TITL(N),N=1,2),(AM(N),N=1,2),STA
      160   LP=LP+1
            LC=0
      161   N=MON(L)
            GO TO (165,170,175,180,181),K
      165   ACVD=ACVD+END1(N,J)
            WRITE(6,208)IY(N),S(L),ACVD,P(L)
            GO TO 135
      170   ACVD=ACVD+END1(N,J)
            WRITE(6,208)IY(N),S(L),ACVD,P(L)
            GO TO 135
      175   ACVD=ACVD+ENGP1(N,J)
            WRITE(6,208)IY(N),S(L),ACVD,P(L)
            GO TO 135
      180   ACVD=ACVD+ENCN1(N,J)
            WRITE(6,208)IY(N),S(L),ACVD,P(L)
            GO TO 135
      181   ACVD=ACVD+ETOT1(N,J)
            WRITE(6,208)IY(N),S(L),ACVD,P(L)
      135   CONTINUE
            WRITE(6,360)VAL50,VAL
      C     GO TO (105,105,105,362,362),IP
      C     CALL OURPLT(S,P,I,TITL,AM,IYS,IYF)
      105   CONTINUE
      103   CONTINUE
            WRITE(6,220)IHDG,IDATE,LP
            WRITE(6,365)
            LP=LP+1
            IF(IK.EQ.3)GO TO 999
      C     ****************************************
      C      DURATION BY STATION BY MONTH FOR PEAK
      C     ****************************************
            ND=0
            NS=0
            DO 570 K=1,5
            DO 571 J=MS,MF
            I=0
            DO 572 M=1,NOY
            I=I+1
            GO TO (560,561,562,563,564),K
      560   US(I)=PDEC(M,J)
            GO TO 572
      561   US(I)=PPK(M,J)
            GO TO 572
      562   US(I)=PDP(M,J)
            GO TO 572
      563   US(I)=PCNP(M,J)
            GO TO 572
      564   US(I)=PTOTA(M,J)
      572   CONTINUE
```

```
      CALL DUR(US,I,IYS,N9,N5,VAL,VAL50)
      TITL(1)=' MONTH'
      TITL(2)='LY    '
      LC=55
      ACVD=0.0
      IYR=0
      CALL MONTH(J,IYR,MD,AM)
      DO 590 L=1,I
      LC=LC+1
      IF(LC.LE.42)GO TO 591
      WRITE(6,220)IHOG,IDATE,LP
      GO TO (592,593,594,595,596),K
  592 STA='DECEM'
      WRITE(6,599)(TITL(N),N=1,2),(AM(N),N=1,2),STA
      GO TO 580
  593 STA=' JUN'
      WRITE(6,599)(TITL(N),N=1,2),(AM(N),N=1,2),STA
      GO TO 580
  594 STA='  0.P'
      WRITE(6,599)(TITL(N),N=1,2),(AM(N),N=1,2),STA
      GO TO 580
  595 STA=' CNP.'
      WRITE(6,599)(TITL(N),N=1,2),(AM(N),N=1,2),STA
      GO TO 580
  596 STA='ALL-75'
      WRITE(6,599)(TITL(N),N=1,2),(AM(N),N=1,2),STA
  580 LP=LP+1
      LC=0
  591 NEMOR(L)
      GO TO (531,532,533,534,535),K
  531 ACVD=ACVD+PDEC(N,J)
      WRITE(6,208)IY(N),S(L),ACVD,P(L)
      GO TO 590
  532 ACVD=ACVD+PRK(N,J)
      WRITE(6,208)IY(N),S(L),ACVD,P(L)
      GO TO 590
  533 ACVD=ACVD+POP(N,J)
      WRITE(6,208)IY(N),S(L),ACVD,P(L)
      GO TO 590
  534 ACVD=ACVD+PCNP(N,J)
      WRITE(6,208)IY(N),S(L),ACVD,P(L)
      GO TO 590
  535 ACVD=ACVD+PTOTA(N,J)
      WRITE(6,208)IY(N),S(L),ACVD,P(L)
  590 CONTINUE
      WRITE(6,360)VAL50,VAL
      GO TO (105,105,105,362,362),IP
C     CALL DURPLT(S,P,I,TITL,AM,IYS,IYF)
  571 CONTINUE
  570 CONTINUE
      WRITE(6,220)IHOG,IDATE,LP
      WRITE(6,365)
      LP=LP+1
      GO TO 999
C     ***MONTHLY ELEVATION DURATION***
  950 DO 620 J=MS,MF
      I=0
```

```
      DO 621 M=1,NOY
      I=I+1
      D*(I)=RELE(M,J)
  621 CONT,NUE
      M9=1
      N9=1
      CALL DUR(US,I,IYS,N9,NS,VAL,VALS)
      TITL(1)='  LAKE'
      TITL(2)='  ERIE'
      LC=50
      ACV=0.0
      CALL  MONTH(J,G,MD,AM)
      DO 771 K=1,I
      LC=LC+1
      IF(LC.LE.42)GO TO 622
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,624)(TITL(N),N=1,2),(AM(N),N=1,2)
      LP=LP+1
      LC=0
  622 NEMOR(K)
      ACV=ACV+RELE(N,J)
      WRITE(6,208)IY(N),S(K),ACV,P(K)
  771 CONTINUE
  620 CONTINUE
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,626)
      LP=LP+1
C     ***OVERALL ELEVATION DURATION***
      NS=1
      N9=1
      CALL DUR(RELET,IX,IYS,N9,NS,VAL,VALS)
      AM(1)='  OVER'
      AM(2)='-ALL  '
      LC=50
      ACV=0.0
      DO 630 K=1,IX
      LC=LC+1
      IF(LC.LE.42)GO TO 631
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,636)(AM(N),N=1,2)
      LP=LP+1
      LC=0
  631 NEMOR(K)
      ACV=ACV+RELET(N)
      WRITE(6,696)IYT(N),MI(N),S(K),ACV,P(K)
  630 CONTINUE
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,632)
      LP=LP+1
C     *****NAVIGATION SEASON ELEV. DURATION****
      NS=1
      N9=1
      CALL DUR(RNAV,INAV,IYS,N9,NS,VAL,VALS)
      TITL(1)='NAVIG'
      TITL(2)='ATION '
      LC=50
      ACV=0.0
```

```
      DO 650 K=1,INAV
      LC=LC+1
      IF(LC.LE.42)GO TO 651
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,636)(TITL(N),N=1,2)
      LP=LP+1
      LC=0
651   N=MOR(K)
      ACV=ACV+RNAV(N)
      WRITE(6,696)IYNAV(N),M3(N),S(K),ACV,P(K)
650   CONTINUE
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,653)
      LP=LP+1
C     ***NON-NAVIGATION SEASON ELEV. DURATION****
      N5=1
      N9=1
      CALL DURIP(NON,INON,IYS,N9,N5,VAL,VAL5)
      TITL(1)='  NON-'
      TITL(2)='NAVIG '
      LC=56
      ACV=0.0
      DO 660 K=1,INON
      LC=LC+1
      IF(LC.LE.42)GO TO 661
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,636)(TITL(N),N=1,2)
      LP=LP+1
      LC=0
661   N=MOR(K)
      ACV=ACV+RNON(N)
      WRITE(6,696)IYNON(N),M2(N),S(K),ACV,P(K)
660   CONTINUE
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,663)
      LP=LP+1
999   IF(IR.LO.2)CALL TOTAL(LOPHO,EOPHN,PTOT,NOY,MS,MF)
      IF(IR.EO.2)CALL TWRITE(IYEAR1,NOY,IHDG)
      STOP
710   FORMAT('1',2I2,5X,F12.2)
745   FORMAT(10X,'CHRONOLOGICAL LISTING OF-',/,
     110X,'(A) PECK + CASCADES DAYTIME DISCHARGE(CFS/1000)',/,
     110X,'(B) PECK DAYTIME DISCHARGE(CFS/1000)',//,
     110X,'YEAR      MONTH      BECK+CASC          BECK',/,
     122X,'CFS/1000',9X,'CFS/1000',/,10X,4('-'),6X,5('-'),
     16X,9('-'),8X,6('-'))
735   FORMAT(10X,'1',12,8X,I2,8X,F7.0,10X,F7.0)
740   FORMAT('***CHRONOLOGICAL LIST OF DISCHARGE COMPLETE***')
930   FORMAT(15X,'DURATION LISTING OF ',A3,A4,2X,'DISCHARGE',
     1'(C.F.S./1000)',/,15X,'FOR ',2A4,/,
     115X,'STATION = ',A12,//,
     12X,'YEAR        DISCHARGE   ACCUMULATED       PERCENT',
     1' OF TIME',/,16X,'(CFS/1000)',6X,'VALUE',9X,'EQUALLED OR EXCEEDED'
     1,/,2X,'----',9X,10('-'),2X,13('-'),9X,6('-'),//)
955   FORMAT('***DISCHARGE DURATION COMPLETED***')
100   FORMAT(2X,2I2,4X,6(F5.2,F5.0))
101   FORMAT(I1,A1,2F6.0)
```

```
      701   FORMAT(1X,I1,A1,2F6.0)
      800   FORMAT()
      801   FORMAT(1H1)
      802   FORMAT(1X)
      803   FORMAT(37X,'FLOW IN CFS',43X,'CANADA ENERGY OUTPUT (AVE.MW.)',/,
     1 96X,'TREATY HOURS-NO POS',/,15X,79('-'),2X,34('-'),/,
     1 11X,' YEAR/          LAKE   L.ERIE    TO       TO       TO',
     1 '       TO     BECK &     TO       TO       TO     DECEW   BECK',
     1 '    OP      CNP    TOTAL',/,1X,'   MONTH        ERIE   ADJUST',
     1 '   GTP     CANADA    USA     DECEW CASCADES',
     1 '  BECK      OP       CNP',/,
     1 11X,'---------      ',10('------- '),5(' ------'),///)
      201   FORMAT(1X,'19',J2,1X,A3,1X,A2,A1,1X,10F8.0,5F7.1)
      202   FORMAT(14,1X,A3,5F10.2)
      203   FORMAT(30X,'PLANT ENERGY (MWH)',//,
     1 115X,57('-'),/,
     1 11X,'YEAR/',11X,'DECEW',8X,'BECK',9X,'OP',9X,'CNP',8X,'TOTAL ',
     1 '    MONTHLY',/,3X,'MONTH',68X,'TOTAL',/,12X,6('   ---------'),///)
      204   FORMAT(1X,'19',J2,1X,A3,' N ',6F12.2)
      205   FORMAT(1X,'19',J2,1X,A3,' D ',5F12.2)
      331   FORMAT(2X,'19',J2,7X,F12.2,A1,2F15.2)
            FORMAT(2X,'19',J2,7X,F12.2,2F15.2)
      52    FORMAT(15X,'DURATION LISTING OF ',A6,A3,' PEAK FOR ',
     1 12A6,///,
     1 12X,'YEAR            PEAK       ACCUMULATED       PERCENT',
     1 ' OF TIME',/,17X,'      ',8X,'VALUE',6X,'EQUALLED OR EXCEEDED',/,
     1 12X,'----',9X,10('-'),2X,13('-'),9X,6('-'),///)
      207   FORMAT(15X,'DURATION LISTING OF ',A6,A3,' ENERGY FOR ',
     1 12A6,' (MW.-OP. HOURS)',///,
     1 12X,'YEAR            ENERGY     ACCUMULATED       PERCENT',
     1 ' OF TIME',/,17X,'(MW )',4X,'VALUE',6X,'EQUALLED OR EXCEEDED',/,
     1 12X,'----',9X,10('-'),2X,13('-'),9X,6('-'),///)
      210   FORMAT(2X,'19',J2,1X,3(F10.0,F13.0),F13.2)
      209   FORMAT(15X,'DURATION LISTING OF ',A6,A3,' ENERGY FOR ',
     1 12A6,' (MW.-OP. HOURS)',///,
     1 115X,'DAYTIME',16X,'NIGHTTIME',14X,'TOTAL',//,
     1 12X,'YEAR ',3('   ENERGY   ACCUMULATED'),'   PERCENT OF TIME',/,
     1 14X,3('      (MW )       VALUE'),4X,'EQUALLED OR EXCEEDED',/,
     1 17X,3(3X,'------',3X,11('-')),7X,'------',///)
      211   FORMAT(10X,'REPORT TYPE : ',J2,1X,A6,/,
     1 11X,'PLOT   TYPE : ',J2,1X,A6,///,
     1 11OA,'FLOW OVER NIAGARA FALLS',/,
     1 11OX,'DAYTIME FLOW BY MONTH (CFS)',/,10X,12F7.0,//,
     1 11OX,'NIGHTTIME FLOW BY MONTH (CFS)',/,10X,12F7.0,///,
     1 11OX,'MONTHLY ADJUSTMENTS (CFS)',//,10X,12F7.0,///,
     1 11OX,'MONTHLY MATERIAL DOCK ELEVATION  (FT)',//,10X,12F8.2,///)
      220   FORMAT(1H1,10X,4A4,5X,'NIAGARA AREA',
     1 149X,2A6,' PAGE : ',I3,///)
      300   FORMAT(' *** MONTHLY TOTAL DURATION AND/OR PLOT COMPLETED ***')
      301   FORMAT(' *** MONTHLY (D) DURATION AND/OR PLOT COMPLETED ***')
      302   FORMAT(' *** MONTHLY (N) DURATION AND/OR PLOT COMPLETED ***')
      303   FORMAT(1H1,'*** BECK TAIL WATER ELEVATION = ',F5.1)
      304   FORMAT(' *** ANNUAL DURATION AND/OR PLOT COMPLETED ***')
      305   FORMAT(//,2X,'AVG.ANNUAL DAYTIME ENERGY=',2X,F15.2)
      306   FORMAT('***ANNUAL DAYTIME DURATION AND/OR PLOT COMPLETED
     1 ***')
      307   FORMAT(//,2X,'AVG.ANNUAL NIGHTTIME ENERGY=',2X,F15.2)
```

```
1026      308   FORMAT('***ANNUAL NIGHTIME DURATION AND/OR PLOT
1027           1COMPLETED***')
1028      322   FORMAT(15X,12F9.2)
1029      309   FORMAT(///,2X,'AVG.ANNUAL TOTAL ENERGY=',2X,F15.2)
1030      250   FORMAT(15X,'DURATION LISTING OF ',A8,1X,A6,'TOTAL ENERGY',///,
1031           12X,'YEAR          ENERGY     ACCUMULATED       PERCENT',
1032           1' OF TIME',/,17X,'(MWH)',9X,'VALUE',6X,'EQUALLED OR EXCEEDED',/,
1033           12X,'----',9X,10('-'),2X,13('-'),9X,6('-'),///)
1034      320   FORMAT(15X,'DURATION LISTING OF ',A6,A3,' ENERGY ',
1035           1'(AVG.MO-OPERATING HRS.)',/,15X,'FOR ',2A6,/,
1036           11SX,'STATION = ',A12,//,
1037           12X,'YEAR          ENERGY     ACCUMULATED       PERCENT',
1038           1' OF TIME',/,16X,'(AVG.MW)',6X,'VALUE',8X,'EQUALLED OR EXCEEDED',/,
1039           12X,'----',9X,10('-'),2X,13('-'),9X,6('-'),///)
1040      599   FORMAT(15X,'DURATION LISTING OF ',A6,A3,' PEAK ',
1041           1'(PEAK MW.)',/,15X,'FOR ',2A6,/,
1042           11SX,'STATION = ',A12,//,
1043           12X,'YEAR          PEAK       ACCUMULATED       PERCENT',
1044           1' OF TIME',/,16),'  (MW.) ',6X,'VALUE',8X,'EQUALLED OR EXCEEDED',/,
1045           12X,'----',9X,10('-'),2X,13('-'),9X,6('-'),///)
1046      360   FORMAT(///,2X,'50% MID. INTERVAL VALUE=',F12.2,
1047           1//,2X,'98% MID. INTERVAL VALUE=',F12.2)
1048      365   FORMAT('***STATION DURATION AND/OR
1049           1PLOT COMPLETED***')
1050      696   FORMAT(2X,'19',J2,1X,I2,4X,F12.2,2F15.2)
1051      672   FORMAT(15X,2A6,' FLOW DURATION',///,2X,'YEAR/MONTH   DISCHARGE',
1052           1'    ACCUMULATED       PERCENT',' OF TIME',/,17X,'(CFS)',8X,
1053           1'VALUE',6X,'EQUALLED OR EXCEEDED',/,2X,10('-'),2X,9('-'),
1054           14X,11('-'),7X,15('-'),//)
1055      673   FORMAT('***OVERALL FLOW DURATION COMPLETED***')
1056      683   FORMAT('***TOURIST SEASON FLOW DURATION COMPLETED***')
1057      693   FORMAT('***NON-TOUR SEASON FLOW DURATION COMPLETED***')
1058      624   FORMAT(15X,'DURATION LISTING OF',2A6,' OVERALL'
1059           1' ELEVATION (FT.) FOR ',2A6,///,
1060           12X,'YEAR          ELEVATION    ACCUMULATED       PERCENT',
1061           1' OF TIME',/,18X,'(FT.)',9X,'VALUE',7X,
1062           1'EQUALLED OR EXCEEDED',/,2X,'----',10X,9('-'),4X,
1063           111('-'),7X,20('-'),//)
1064      636   FORMAT(15X,2A6,' ELEV. DURATION',///,2X,'YEAR/MONTH   ELEVATION',
1065           1'    ACCUMULATED       PERCENT',' OF TIME',/,17X,'(FT.)',8X,
1066           1'VALUE',8X,'EQUALLED OR EXCEEDED',/,2X,10('-'),3X,9('-'),
1067           14X,11('-'),7X,15('-'),//)
1068      626   FORMAT('*** MONTHLY ELEVATION DURATION COMPLETED ***')
1069      632   FORMAT('*** OVERALL ELEVATION DURATION COMPLETED ***')
1070      653   FORMAT('*** NAVIGATION DURATION COMPLETED ***')
1071      663   FORMAT('*** NON-NAV. DURATION COMPLETED ***')
1072            END

$END
$END IGNORLD - IN CONTROL MODE

$FIN
```

****** LOAD/ ****** DATE 052881 PAGE 45

RUNID:XLERIS ACCT:AN9320 PROJ:MSTG4 MAX SUPS 00:10:00

SEND OUTPUT TO DENT-MISF3

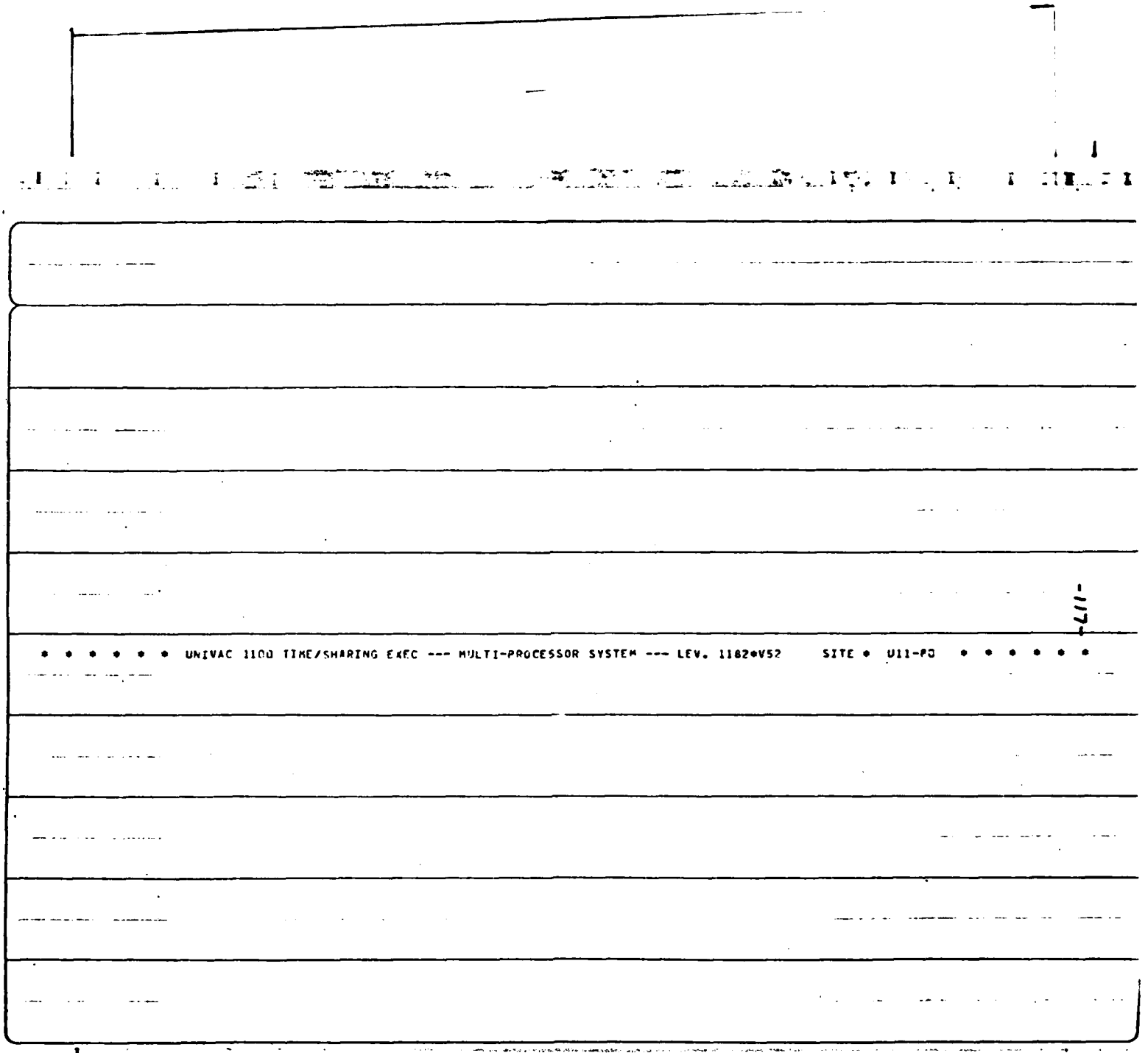
XLERIS FIN

PRIORITY: 0 TAPEMOUNTS: 0 MAX SERVOS: 0 ACTUAL SUPS 00:00:41

MAX CORE: 72016 MAX TRACKS: 16 CPU TIME 00:00:00

IMAGES IN: 48 CARDS OUT: 0 PAGES OUT: 46

LAPSED MINS: 0 ARR 10:59 TERM 16:07:04 28MAY81 COST $ .40


-117-
* * * * * * UNIVAC 1100 TIME/SHARING EXEC --- MULTI-PROCESSOR SYSTEM --- LEV. 1182@V52 SITE * U11-PO * * * * * *

```
          XX        XX      LL              EEEEEEEEEEEE    RRRRRRRRRR          IIIIII          FFFFFFFFFFFF
           XX      XX       LL              EEEEEEEEEEEE    RRRRRRRRRRR         IIIIII          FFFFFFFFFFFF
            XX    XX        LL              EE              RR        RR          II            FF
             XX  XX         LL              EE              RR        RR          II            FF
              XXXX          LL              EE              RR        RR          II            FF
               XX           LL              EEEEEEEE        RRRRRRRRRR          II            FFFFFFFF
               XX           LL              EEEEEEEE        RRRRRRRRRR          II            FFFFFFFF
              XXXX          LL              EE              RR     RR           II            FF
             XX  XX         LL              EE              RR      RR          II            FF
            XX    XX        LL              EE              RR       RR         II            FF
           XX      XX       LLLLLLLLLLLLL   EEEEEEEEEEEE    RR        RR        IIIIII        FF
          XX        XX      LLLLLLLLLLLLL   EEEEEEEEEEEE    RR         RR       IIIIII        FF


DDDDDDD    EEEEEEEE  NN      NN  TTTTTTTT        KK    KK          GGGGGGG
DDDDDDDD   EEEEEEEE  NNN     NN  TTTTTTTT        KK   KK          GGGGGGGG
DD     DD  EE        NNNN    NN     TT           KK  KK          GG
DD     DD  EE        NN NN   NN     TT           KK KK           GG
DD     DD  EE        NN  NN  NN     TT           KKKK            GG
DD     DD  EEEEE     NN   NNNN     TT           KKK             GG
DD     DD  EEEEE     NN    NNN     TT           KKK             GG
DD     DD  EE        NN     NN     TT           KKKK            GG
DD     DD  EE        NN     NN     TT           KK KK           GG      GG
DD     DD  EE        NN     NN     TT           KK  KK          GG      GG
DDDDDDDD   EEEEEEEE  NN     NN     TT           KK   KK         GGGGGGGG
DDDDDDD    EEEEEEEE  NN     NN     TT           KK    KK          GGGGGG

@ENT K G

* * * * * * UNIVAC 1100 TIME/SHARING EXEC --- MULTI-PROCESSOR SYSTEM --- LEV. 1182-V52    SITE * U11-80 * * * * * * *

MM      MM    1   5555555  FFFFFFFF  3333333
MM      MM   11   5555555  FFFFFFFF  3333333
MM      MM  111   55       FF              33
MM      MM   11   55       FF              33
MM      MM   11   55       FF           33
MM      MM   11   55       FF           33
MMMMMMMMM    11    55555   FFFFF        33
MMMMMMMMM    11       55   FFFFF        33
MM      MM   11       55   FF           33
MM      MM   11       55   FF              33
MM      MM   11   55  55   FF              33
MM      MM   11   55555    FF        33    33
MM      MM  1111    555    FF        3333333

M15F3

    RUNID * XLERIF        USER ID * GWTP          PAPT NUMBER * 00     INPUT DEVICE *          OUTPUT DEVICE * PR4

    FILE NAME * PR0000XLERIF          CREATED AT:  10:12:39 JUN 11,1981          PRINTED AT:  10:19:52 JUN 11,1981
```


1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890**SEQ NO. 00

```
@RUN,P      XLERIE,AN9320/GWTP,HST64,10,500

@LOG SEND OUTPUT TO DENT-H15F3

@ASG,A NIAG2.
```

```
@SSG,IKE   ,MSTG4+N1A62./Z
SSG 12R1-M2 73R1M3 06/11/81 10:17:41
```

SSG STREAM GENERATION STATEMENTS

Z	SUBDURPLT	5
Z	RELMAPLOAD	1, 1
Z	SUBPGS	5
Z	SUBDUR	5
Z	SUBMONTH	5
Z	SUBBHW	5
Z	SUBMONTH	1, 1
Z	SUBDUR	1, 1
Z	SUBPOND	5
Z	SUBCAS	1, 1
Z	SUBCAS	5
Z	SUBTOTAL	5
Z	RWLZW1	5
Z	RWLZJ2	5
Z	DAT1	1, 1
Z	DAT1	6
Z	DAT1	5
Z	DAT3	5
Z	DAT3	6
Z	DAT3	1, 1
Z	SUBSCHEME	5
Z	SUBPEAK	1, 1
Z	SUBPEAK	5
Z	SUBBHW	1, 1
Z	SUBPOND	1, 1
Z	SUBTOTAL	1, 1
Z	RWLZW1	1, 4
Z	RWLZJ2	1, 4
Z	SUBDURPLT	1, 1
Z	SUBPGS	1, 1
Z	SUBSCHEME	1, 1
Z	MAPLOAD	1, 1
Z	MAPLOAD	5
Z	ADJUST	1, 1
Z	ADJUST	5
Z	LOAD	5
Z	LOAD	1, 1
Z	SUBDEC	1, 1
Z	SUBDEC	5
Z	LOAD	6

-121-

```
SSG   REVISED   SKELETON

0001  00    *INCREMENT A FROM 1 BY 1 TO [Z]
0002  01      *IF [Z,A,3,1] <5
0003  02        #HDG  ****** [Z,A,1,1]/[Z,A,2,1] ******
0004  02        #PRT,S  HSTG4*NIA62,[Z,A,1,1]/[Z,A,2,1]
0005  01      *END
0006  00    *LOOP
```


PRECEDING PAGE BLANK-NOT FILMED

```
SSG   GENERATED OUTPUT STREAM        PART 1

000001              @HDG  ****** RELMAPLOAD/              ******
000002              @PRT,S  HSTG4*NIAG2.RELMAPLOAD/
000003              @HDG  ****** SUBMONTH/              ******
000004              @PRT,S  HSTG4*NIAG2.SUBMONTH/
000005              @HDG  ****** SUBDUR/              ******
000006              @PRT,S  HSTG4*NIAG2.SUBDUR/
000007              @HDG  ****** SUBCAS/              ******
000008              @PRT,S  HSTG4*NIAG2.SUBCAS/
000009              @HDG  ****** DAT1/              ******
000010              @PRT,S  HSTG4*NIAG2.DAT1/
000011              @HDG  ****** DAT3/              ******
000012              @PRT,S  HSTG4*NIAG2.DAT3/
000013              @HDG  ****** SUBPEAK/              ******
000014              @PRT,S  HSTG4*NIAG2.SUBPEAK/
000015              @HDG  ****** SUBBHW/              ******
000016              @PRT,S  HSTG4*NIAG2.SUBBHW/
000017              @HDG  ****** SUBPOND/              ******
000018              @PRT,S  HSTG4*NIAG2.SUBPOND/
000019              @HDG  ****** SUBTOTAL/              ******
000020              @PRT,S  HSTG4*NIAG2.SUBTOTAL/
000021              @HDG  ****** MWLZW1/              ******
000022              @PRT,S  HSTG4*NIAG2.MWLZW1/
000023              @HDG  ****** MWLZJ2/              ******
000024              @PRT,S  HSTG4*NIAG2.MWLZJ2/
000025              @HDG  ****** SUBDURPLT/              ******
000026              @PRT,S  HSTG4*NIAG2.SUBDURPLT/
000027              @HDG  ****** SUBPGS/              ******
000028              @PRT,S  HSTG4*NIAG2.SUBPGS/
000029              @HDG  ****** SUBSCHEME/              ******
000030              @PRT,S  HSTG4*NIAG2.SUBSCHEME/
000031              @HDG  ****** MAPLOAD/              ******
000032              @PRT,S  HSTG4*NIAG2.MAPLOAD/
000033              @HDG  ****** ADJUST/              ******
000034              @PRT,S  HSTG4*NIAG2.ADJUST/
000035              @HDG  ****** LOAD/              ******
000036              @PRT,S  HSTG4*NIAG2.LOAD/
000037              @HDG  ****** SUBDEC/              ******
000038              @PRT,S  HSTG4*NIAG2.SUBDEC/

END SSG     TIME =  00:00:01  HIGHEST ADDRESS =  0061552  OCTAL

@HDG  ****** RELMAPLOAD/              ******

@PRT,S  HSTG4*NIAG2.RELMAPLOAD/
FURPUR 28R1.H2.6 E35 S74T11 06/11/81 10:17:43
```

```
****** RELMAPLOAD/              ******                                                    DATE 061181        PAGE    6
HSTG4*NIAG2(1).RELMAPLOAD(5)
      @SFOR NIAG.LOAD
      @
      @MAP,N ,NIAG.LOAD
      IN SYS$HYDRO*LIB.GETDAY
      IN NIAG.LOAD
      IN NIAG.SUBMONTH
      IN NIAG.SUBDUR
      IN NIAG.SUBDURPLT
      IN NIAG.SUBBHW
      IN NIAG1.SUBPEAK
      IN NIAG1.SUBPGS
      IN NIAG.SUBCAS
      IN NIAG.SUBDEC
      END

@HDG  ****** SUBMONTH/              ******

@PRT.S  HSTG4*NIAG2.SUBMONTH/
FURPUR 28R1.H2.6 E35 S74T11 06/11/81 10:17:43
```

```
HSTG4*NIAG2(1).SUBMONTH(6)
                SUBROUTINE MONTH(M,IY,MD,AM)
      C           CALCULATION OF DAYS IN MONTH AND NAME OF MONTH
      C           BASED ON INTEGER VALUE OF MONTH AND YEAR
      C             M = INTEGER VALUE OF MONTH
      C             IY = LAST TWO DIGITS OF THE YEAR
      C             MD = CALCULATED NO. OF DAYS IN THE MONTH
      C             AM = ALPHANUMERIC MONTH LABEL
                DIMENSION AM(2),AMON(12,2)
                DATA ((AMON(I,J),J=1,2),I=1,12)/'JANUAR','Y','FEBRUA','RY',
               1'MARCH','  ','APRIL','  ','MAY','  ','JUNE','  ','JULY',
               1'  ','AUGUST','  ','SEPTEM','BER','OCTOBE','R','NOVEMB',
               1'ER','DECEMB','ER'/
                IF((M.GT.12).OR.(M.LT.1))GO TO 50
                GO TO (31,28,31,30,31,30,31,31,30,31,30,31),M
      30        MD=30
                GO TO 32
      31        MD=31
                GO TO 32
      28        IY=1900+IY
                ITY=IY/4
                ITY=ITY*4
                MD=28
                IF(ITY.EQ.IY) MD=29
      32        CONTINUE
                DO 1 I=1,2
      1         AM(I)=AMON(M,I)
                GO TO 13
      50        WRITE(6,55)
      55        FORMAT(10X,'***ERROR- M.GT.12.OR.M.LT.1')
      13        RETURN
                END

@HDG  ****** SUBDUR/          ******

@PRT,S  HSTG4*NIAG2.SUBDUR/
FURPUR 28R1.H2.6 E35 S74T11 06/11/81 10:17:44
```

-126-

```
HST64*NIAG2(1).SUBDUR(19)
    1            COMPILER (XM=1)
    2            SUBROUTINE DUR(A,NOV,IY1,N98,N50,VALUE,VAL50)
    3       C    DURATION ROUTINE TO SORT INPUT VALUES
    4       C         A - UNSORTED VECTOR
    5       C         S - SORTED VECTOR
    6       C         P - DURATION PERCENT
    7       C         M - ORIGINAL POSITION OF SORTED ELEMENT
    8            DIMENSION A(1200)
    9            COMMON QEAC(100,12),QEECK(100,12),DISDEC(100,12),
   10           1POP(100,12),PCNP(100,12),PDEC(100,12),PBK(100,12),
   11           1PTOT(100,12),PTOTA(100,12),P(1200),S(1200),MOR(1200)
   12            IF(NOV.GT.1200) GO TO 6
   13            IF(N98.EQ.1) GO TO 7
   14            IF(NOV.GE.25)GO TO 7
   15            WRITE(6,45)
   16            GO TO 7
   17       6    WRITE(6,200)
   18            GO TO 999
   19       7    L=0
   20            IDUM=0
   21            ID50=0
   22       5    L=L+1
   23            XM=0.0
   24            IF(L.GT.NOV) GO TO 13
   25            DO 32 I=1,NOV
   26            IF(L.EQ.1) GO TO 11
   27            LM1=L-1
   28            DO 10 N=1,LM1
   29            IF(I.EQ.MOR(N)) GO TO 32
   30       10   CONTINUE
   31       11   IF(XM.LE.A(I)) GO TO 20
   32            GO TO 32
   33       20   XM=A(I)
   34            MOR(L)=I
   35       32   CONTINUE
   36            GO TO 5
   37       13   DO 12 K=1,NOV
   38            ID=0
   39            M=MOR(K)
   40            S(K)=A(M)
   41       15   P(K)=(((2.*(FLOAT(K)))-1.)/(2.*(FLOAT(NOV))))*100.
   42            IF(N50.EQ.1)GO TO 65
   43            IF(P(K).EQ.50.0)GO TO 60
   44            IF(P(K).GT.50.0)GO TO 70
   45       65   IF(N98.EQ.1)GO TO 12
   46            IF(NOV.LT.25)GO TO 12
   47            IF(P(K).EQ.98.0)GO TO 80
   48            IF(P(K).GT.98.0)GO TO 40
   49            GO TO 12
   50       60   VAL50=S(K)
   51            ID50=1
   52            GO TO 12
   53       70   IF(ID50.EQ.1)GO TO 65
   54            IJ=K-1
   55            ID50=1
   56            VAL50=S(K)+(((S(IJ)-S(K))/(P(K)-P(IJ)))*(P(K)-50.0))
```

```
      GO TO 12
   80 VALUE=S(K)
      IDUM=1
      GO TO 12
   40 IF(IDUM.EQ.1)GO TO 12
      J=K-1
      IDUM=1
      VALUE=S(K)+(((S(J)-S(K))/(P(K)-P(J)))*(P(K)-98.0))
   12 CONTINUE
      IF(N98.EQ.1)VALUE=0.0
      IF(N50.EQ.1)VAL50=0.0
  500 FORMAT()
   45 FORMAT(1H1,'SORT VECTOR TOO SMALL FOR 98% VALUE-MUST BE >25',/)
  200 FORMAT(1H1,' SORT VECTOR TOO LARGE - MUST BE <1200',/)
  999 RETURN
      END
```

**** SUBCAS/ ******

```
HSTG4*NIAG2.SUBCAS/
8R1.H2.6 E35 S74T11 06/11/81 10:17:44
```

```
HSTG4*NIAG2(1).SUBCAS(5)
                SUBROUTINE CAS(QC,J,ENDR,ITIME,QB,QBA,QOP,QCNP)
        C     CALCULATION OF DISCHARGE FOR OP CNP AND BECK ADJUSTED
        C    USING CASCADE DISCHARGE AND BECK DISCHARGE AS INPUT
        C      INPUT VALUES QC,J,ITIME,QB
        C      OUTPUT VALUES QBA,QOP,QCNP
                IF(QC.EQ.0.0) GO TO 10
                IF(QC.GT.8300.0) GO TO 20
                QOP=QC
                QCNP=0.0
                QBA=QB
                GO TO 50
        20      QOP=8300.0
                QCNP=QC-QOP
                QBA=QB
                GO TO 50
        10      QOP=0.0
                QCNP=0.0
                QBA=QB
        50      RETURN
                END

@HDG  ****** DAT1/          ******

@PRT.S  HSTG4*NIAG2.DAT1/
FURPUR 28R1.H2.6 E35 S74T11 06/11/81 10:17:45
```

-129-

```
HSTG4*NIAG2(1).DAT1(4)
                DIMENSION XLOS(100,12),XLOQ(100,12),IY(100)
                MON1=1
                MON3=6
                READ(5,98)IDUM
                READ(5,11)((XLOS(I,J),J=1,12),IY(I),I=1,77)
                READ(5,97)IDUM
                READ(5,10,END=99)((XLOQ(I,J),J=1,12),I=1,77)
                DO 20 J=1,12
                DO 22 I=1,77
                XLOS(I,J)=XLOS(I,J)*100
                XLOQ(I,J)=XLOQ(I,J)*100
        22      CONTINUE
        20      CONTINUE
        99      DO 25 N=1,77
                WRITE(26,45)IY(N),(XLOS(N,J),J=1,12)
                WRITE(27,57)IY(N),MON1,(XLOS(N,J),XLOQ(N,J),J=1,3),
               1XLOS(N,4),XLOQ(N,4),XLOS(N,4),XLOQ(N,4),(XLOS(N,J),
               1XLOQ(N,J),J=5,6)
                WRITE(27,57)IY(N),MON3,(XLOS(N,J),XLOQ(N,J),J=7,11),
               1XLOS(N,12),XLOQ(N,12),XLOS(N,12),XLOQ(N,12)
        25      CONTINUE
                WRITE(27,35)
        98      FORMAT(A1,/)
        10      FORMAT(12F6.2)
        11      FORMAT(12F6.2,4X,I4)
        97      FORMAT(A1)
        45      FORMAT(I4,6X,12F6.0)
        57      FORMAT(I4,J2,4X,14F6.0)
        35      FORMAT('9999')
                STOP
                END

@HDG  ****** DAT3/          ******

@PRT,S  HSTG4*NIAG2.DAT3/
FURPUR 28R1.H2.6 E35 S74T11 06/11/81 10:17:45
```

-130-

```
HSTG**NIAG2(1).DAT3(39)
      1            DIMENSION XSQ(100,12),XSS(100,12),XMHS(100,12),
      2           1XMHQ(100,12),XLES(100,12),XLEQ(100,12),IY(100),XLOS(100,12),
      3           1XLOQ(100,12)
      4            MON1=1
      5            MON2=7
      6      C     READ(5,96)IDUM
      7            READ(5,98)IDUM
      8            MON3=8
      9            READ(5,11)((XSS(I,J),J=1,12),IY(I),I=1,77)
     10            READ(5,98) IDUM
     11            READ(5,10)((XSQ(I,J),J=1,12),I=1,77)
     12            READ(5,9E) IDUM
     13            READ(5,10)((XMHS(I,J),J=1,12),I=1,77)
     14            READ(5,98) IDUM
     15            READ(5,10)((XMHQ(I,J),J=1,12),I=1,77)
     16            READ(5,98) IDUM
     17            READ(5,10)((XLES(I,J),J=1,12),I=1,77)
     18            READ(5,98) IDUM
     19            READ(5,10)((XLEQ(I,J),J=1,12),I=1,77)
     20            READ(5,98) IDUM
     21            READ(5,10)((XLOS(I,J),J=1,12),I=1,77)
     22            READ(5,98) IDUM
     23            READ(5,10,END=99)((XLOQ(I,J),J=1,12),I=1,77)
     24      99    DO 20 J=1,12
     25            DO 22 I=1,77
     26            XSS(I,J)=XSS(I,J)*100.
     27            XSQ(I,J)=XSQ(I,J)*100.
     28            XMHS(I,J)=XMHS(I,J)*100.
     29            XMHQ(I,J)=XMHQ(I,J)*100.
     30            XLES(I,J)=XLES(I,J)*100.
     31            XLEQ(I,J)=XLEQ(I,J)*100.
     32            XLOS(I,J)=XLOS(I,J)*100.
     33            XLOQ(I,J)=XLOQ(I,J)*100.
     34      22    CONTINUE
     35      20    CONTINUE
     36            I=77
     37            DO 25 N=1,I
     38            WRITE(25,45)IY(N),(XMHS(N,J),J=1,12)
     39            WRITE(26,55)IY(N),MON1,(XLES(N,J),XLEQ(N,J),J=1,6)
     40            WRITE(26,55)IY(N),MON2,(XLES(N,J),XLEQ(N,J),J=7,12)
     41            WRITE(27,57)IY(N),MON1,(XLOS(N,J),XLOQ(N,J),J=1,3),
     42           1XLOS(N,4),XLOQ(N,4),XLOS(N,4),XLOQ(N,4),(XLOS(N,J),
     43           1XLOQ(N,J),J=5,6)
     44            WRITE(27,57)IY(N),MON3,(XLOS(N,J),XLOQ(N,J),J=7,11),
     45           1XLOS(N,12),XLOQ(N,12),XLOS(N,12),XLOQ(N,12)
     46      25    CONTINUE
     47            WRITE(26,35)
     48            DO 31 N=1,I
     49      31    WRITE(26,45)IY(N),(XLOS(N,J),J=1,12)
     50            WRITE(2 ,35)
     51            WRITE(27,35)
     52            DO 30 N=1,I
     53            WRITE(25,50)IY(N),MON1,(XSS(N,J),XSQ(N,J),J=1,6)
     54            WRITE(25,50)IY(N),MON2,(XSS(N,J),XSQ(N,J),J=7,12)
     55      30    CONTINUE
     56            WRITE(25,35)
```

```
10    FORMAT(12F6.2)
35    FORMAT('9999')
45    FORMAT(I4,6X,12F6.0)
50    FORMAT(I4,J2,4X,12F6.0)
55    FORMAT(I4,J2,4X,6(F6.0,F6.0))
57    FORMAT(I4,J2,4X,14F6.0)
98    FORMAT(A1)
11    FORMAT(12F6.2,4X,I4)
97    FORMAT(A1,312(/))
      STOP
      END
```

@HDG ****** SUBPEAK/ ******

```
@PRT,S  HSTG4*NIAG2.SUBPEAK/
FURPUR 28R1.H2.6 E35 S74T11 06/11/81 10:17:46
```

```
HSTG4*NIAG2(1).SUBPEAK(22)
      C     NIAGARA PEAK PROGRAM- CALCULATION OF PEAK VALUES
      C     FOR EACH STATION BASED ON MONTH,BECK DAYTIME DISCHARGE(QBECK)
      C     BECK AND CASCADES DAYTIME DISCHARGE(QBAC) AND
      C     DECEW DISCHARGE (DISDEC)
            COMPILER (XM=1)
            SUBROUTINE PEAK(NOY,MS,MF)
            COMMON QEAC(100,12),QBECK(100,12),DISDEC(100,12),
           1FOP(100,12),PCNP(100,12),PDEC(100,12),PBK(100,12),
           1PTOT(100,12),PTOTA(100,12),P(1200),S(1200),MOR(1200)
            DO 200 I=1,NOY
            DO 200 J=MS,MF
      C     WRITE(6,333)I,J,QBECK(I,J),QBAC(I,J)
      C     FORMAT(I2,1X,I2,1X,'QBECK= ',F8.0,5X,'QBAC= ',F8.0)
            IF(J.LT.4.OR.J.GT.10)GO TO 10
            POP(I,J)=0.0114754*QBAC(I,J)-625.9E361
            IF(POP(I,J).GT.105.0)POP(I,J)=105.0
            IF(POP(I,J).LT.0.0)POP(I,J)=0.0
            PCNP(I,J)=0.0073*QBAC(I,J)-482.979
            IF(PCNP(I,J).GT.75.0)PCNP(I,J)=75.0
            IF(PCNP(I,J).LT.0.0)PCNP(I,J)=0.0
            IF(QBECK(I,J).GT.55500.)GO TO 20
            IF(QBECK(I,J).GT.51000..AND.QBECK(I,J).LE.55500.)GO TO 30
            IF(QBECK(I,J).GT.41000..AND.QBECK(I,J).LE.51000.)GO TO 40
            IF(QBECK(I,J).GT.28000..AND.QBECK(I,J).LE.41000.)GO TO 50
            PBK(I,J)=651.14286+25.10714E-3*QBECK(I,J)-53.57143E-9
           1*QBECK(I,J)**2
            IF(PBK(I,J).LT.0.0)PBK(I,J)=0.0
            GO TO 100
     50     PBK(I,J)=818.540116+14.632403E-3*QBECK(I,J)+107.65965E-9
           1*QBECK(I,J)**2
            GO TO 100
     40     PBK(I,J)=874.97232+14.925E-3*QBECK(I,J)+66.9643E-9*QBECK(I,J)**2
            GO TO 100
     30     PBK(I,J)=-927.94596+89.71354E-3*QBECK(I,J)-706.45217E-9
           1*QBECK(I,J)**2
            IF(PBK(I,J).GT.1875.0)PBK(I,J)=1875.0
            GO TO 100
     20     PBK(I,J)=1875.0
            GO TO 100
     10     POP(I,J)=0.0106061*QBAC(I,J)-570.60606
            IF(POP(I,J).GT.105.0)POP(I,J)=105.0
            IF(POP(I,J).LT.0.0)POP(I,J)=0.0
            PCNP(I,J)=0.0038030*QBAC(I,J)-241.7426
            IF(PCNP(I,J).LT.0.0)PCNP(I,J)=0.0
            IF(PCNP(I,J).GT.75.0)PCNP(I,J)=75.0
            IF(J.LT.4)GO TO 80
            GO TO 101
     80     IF(PCNP(I,J).GT.7.6)PCNP(I,J)=7.6
     101    IF(QBECK(I,J).GT.54500.)GO TO 130
            IF(QBECK(I,J).GT.51000..AND.QBECK(I,J).LE.54500.)GO TO 120
            IF(QBECK(I,J).GT.36000..AND.QBECK(I,J).LE.51000.)GO TO 110
            PBK(I,J)=646.56549+25.80068E-3*QBECK(I,J)-63.988E-9*QBECK(I,J)**2
            IF(PBK(I,J).LT.0.0)PBK(I,J)=0.0
            GO TO 100
     130    PBK(I,J)=729.4+20.2343E-3*QBECK(I,J)+25.53817E-9*QBECK(I,J)**2
            GO TO 100
```

```
      120   PBK(I,J)=-2078.9231+0.1342256*QBECK(I,J)-1.13006E-6*QBECK(I,J)**2
            IF(PBK(I,J).GT.1880.)PBK(I,J)=1880.
            GO TO 100
      110   PBK(I,J)=1680.
      100   PDEC(I,J)=153.26575+1.484558E-3*DISDEC(I,J)-202.0055E-9
           1*DISDEC(I,J)**2
            IF(DISDEC(I,J).GE.6800.)PDEC(I,J)=154.6
            IF(DISDEC(I,J).EQ.0.0)PDEC(I,J)=0.0
            PTOT(I,J)=POP(I,J)+PCNP(I,J)+PDEC(I,J)+PBK(I,J)
            PTOTA(I,J)=PTOT(I,J)-75.0
      C     WRITE(6,444)POP(I,J),PCNP(I,J),PBK(I,J),PDEC(I,J),
      C    1PTOT(I,J),PTOTA(I,J)
      C     FORMAT(6F8.2)
      300   CONTINUE
      200   CONTINUE
            RETURN
            END
```

@HDG ****** SUBBHW/ ******

```
@PRT,S  HSTG4*NIAG2.SUBBHW/
FURPUR 28R1.H2.6 E35 S74T11 06/11/81 10:17:46
```

```
HST64*NIAG2(1).SUBHW(2)
      1            SUBROUTINE BHW(QTEST,EMD,MON,QB,HW)
      2      C     HEADWATER ELEVATION CALCULATIONS FOR BECK G.S.
      3      C     HEADWATER IS USED IN ENERGY CALCULATIONS FOR BECK
      4      C     OUTPUT IS HEADWATER LEVEL HW AND BACK DISCHARGE QB
      5            DIMENSION C(5)
      6            IF(MON.GT.1.AND.MON.LT.6) GO TO 1
      7            IF(MON.GT.6) GO TO 2
      8            C(1)=-0.1277405E-03
      9            C(2)=-0.2766605E-02
     10            C(3)= 0.1431910E+00
     11            C(4)=-0.2C52657E+01
     12            C(5)= 0.1057558E+02
     13            GO TO 3
     14      1     C(1)= 0.4C84246E-03
     15            C(2)=-0.1404717E-01
     16            C(3)= 0.2154076E+00
     17            C(4)=-0.2123795E+01
     18            C(5)= 0.9633192E+01
     19            GO TO 3
     20      2     C(1)= 0.1875383E-03
     21            C(2)=-0.9735033E-02
     22            C(3)= 0.1F87179E+00
     23            C(4)=-0.2099886E+01
     24            C(5)= 0.1169494E+02
     25      3     HW=540.0
     26            GO TO 4
     27      5     HW=HW+0.05
     28      4     T1=SQRT(EMD-HW)
     29            T4=QTEST/T1
     30            T2=(((EMD+HW)/2.0)-547.5)*.788
     31            T3=C(5)
     32            DO 6 I=4,1,-1
     33            T3=(C(5-I)*(T2**I))+T3
     34     6      CONTINUE
     35            T3=15600.0-(T3*253.807107)
     36            IF(HW.GT.540.0) GO TO 7
     37            IF(T3.LT.T4) GO TO 8
     38      7     IF(T3.LT.T4) GO TO 9
     39            QUP=T3
     40            HWL=HW
     41            GO TO 5
     42      9     QLOW=T3
     43            HW=HWL+((0.05/(QUP-QLOW))*(QUP-T4))
     44            QB=T4*T1
     45            RETURN
     46      C     WRITE(6,500) QB,HW,MON
     47      8     QB=T3*T1
     48            RETURN
     49      C     WRITE(6,500) QB,HW
     50      500   FORMAT()
     51            END

BHDG ****** SUBPOND/ ******
```

```
$PRT,S  HST64*NIAG2.SUBPOND/
FURPUR 28R1.H2.6 E35 S74T11 06/11/81 10:17:47
```

```
HSTG4*NIAG2(1).SUBPOND(2)
                SUBROUTINE POND(QOP,QCA,PD,PN,IFLAG)
        C       CALCULATION OF DAY/NIGHT PONDING PD, PN
        C       INPUT OP, DISCHARGE QOP AND CANADIAN SHARE QCA
        C       FLAG IFLAG=1 INDICATES PONDING ON CONDITION
                IF(QOP.GT.7190.)PN=7190
                IF(QOP.LE.7190.)PN=QOP
                PD=PN*(10.43/13.57)
                QCA=QCA-PN
                IFLAG=1
                RETURN
                END

@HDG  ****** SUBTOTAL/          ******

@PRT,S  HSTG4*NIAG2.SUBTOTAL/
FURFUR 28R1.H2.6 E35 S74T11 06/11/81 10:17:47
```

```
HSTG4*NIAG2(1).SUBTOTAL(5)
                SUBROUTINE TOTAL(ETD,ETN,PEAT,NOY,MS,MF)
      C         SETS UP MATRIX MW FOR OUTPUT ONTO MASTER TAPE
      C         INPUT IS TOTAL DAY, TOTAL NIGHT ENERGIES AND PEAK
                COMMON MW(12,100,3)
                DIMENSION ETD(100,12),ETN(100,12),PEAT(100,12)
                DO 10 K=1,3
                DO 20 J=1,NOY
                DO 30 I=MS,MF
                IF(K.EQ.1)MW(I,J,K)=ETD(J,I)+0.5
                IF(K.EQ.2)MW(I,J,K)=ETN(J,I)+0.5
      30        IF(K.EQ.3)MW(I,J,K)=PEAT(J,I)+0.5
      20        CONTINUE
      10        CONTINUE
                RETURN
                END

@HDG  ****** MWLZW1/          ******

@PRT,S  HSTG4*NIAG2.MWLZW1/
FURPUR 28R1.H2.6 E35 S74T11 06/11/81 10:17:48
```

-138-

```
HSTG4*NIAG2(1).MWLZW1(12)
      SUBROUTINE TWRITE(IYR1,INDEX,IH)                                  Y
C     SUBROUTINE THAT OUTPUTS MW MATRIX TO MASTER MAGNETIC TAPE
C     INPUT IS START YEAR IYR1, TOTAL NO. OF YRS INDEX AND HEADING IH
C     MATRIX MW TRANSFERED BY COMMON STATEMENT
      COMMON MW(12,100,3)
      DIMENSION NEXTID(5),XVAL(12,3),JHDG(5),IH(4)                      Y
      INTEGER XVAL                                                      Y
      DATA JHDG(5)/4HNIAG/
      IFLAG = 0
      DO 97 I = 1,4                                                     Y
   97 JHDG(I) = IH(I)                                                  Y
    1 READ(8) NEXTID,NYRS                                               Y
      IF(IFLAG.EQ.1.AND.NEXTID(1).EQ.4H9999) GO TO 99
      IF(IFLAG.EQ.1) GO TO 2
      IF(NEXTID(1).EQ.4H9999) GO TO 5
      DO 7 I = 1,5                                                      Y
      IF(NEXTID(I).GT.JHDG(I)) GO TO 5                                  Y
      IF (NEXTID(I).LT.JHDG(I))GO TO 2                                  Y
    7 CONTINUE                                                          Y
      GO TO 10                                                          Y
    2 WRITE (9) NEXTID,NYRS                                             Y
      DO 3 I=1,NYRS                                                     Y
      READ(8) IYEAR,XVAL                                                Y
    3 WRITE(9) IYEAR,XVAL                                               Y
      GO TO 1                                                           Y
   10 WRITE(6,11)                                                       Y
   11 FORMAT(//////10X,110HIDENTIFICATION FOR NEW CASE IS THE SAME AS TH Y
     *AT FOR THE PREVIOUS ONE, PREVIOUS CASE HAS BEEN DELETED FROM TAPE) Y
      DO 13 I=1,NYRS                                                    Y
   13 READ(8) IYEAR,XVAL                                                Y
      READ(8) NEXTID,NYRS                                               Y
    5 WRITE(6,105) JHDG
  105 FORMAT(1H1,9X, 6HSTUDY(,5A4, 26H) IS BEING WRITTEN ON TAPE)
      WRITE(9) JHDG,INDEX
      IFLAG = 1
      IYR1=IYR1-1
      DO 20 J=1,INDEX                                                   Y
      DO 16 K=1,3                                                       Y
      DO 16 I=1,12
   16 XVAL(I,K) = MW(I,J,K)
      IYEAR = IYR1+J                                                   Y
      WRITE(9) IYEAR,XVAL                                               Y
   20 CONTINUE                                                          Y
      IF(NEXTID(1).NE.4H9999) GO TO 2
   99 WRITE(9) NEXTID,NYRS                                              Y
      END FILE 9                                                        Y
      REWIND 8
      REWIND 9
      RETURN                                                            Y
      END                                                               Y

@HDG ****** MWLZJ2/ ******

@PRT.S HSTG4*NIAG2.MWLZJ2/
```

FURPUP 2861.H2.6 E35 S74T11 06/11/81 10:17:48

```
HSTG4*NIAG2(1).MWLZJ2(8)
      SUBROUTINE PGS1(DAYMWH,EVEMWH,Q,JMONTH)
C     CALCULATION OF PGS GAIN/LOSS IN MWHR
      REAL IRFLOW
      IRFLOW=Q
C
      DIMENSION CDGTS(3,4),CDGNTS(3,4),CNLTS(3),CNLNTS(3),RANGE(4,2)
C
      DATA ((CDGTS(I,J),I=1,3),J=1,4) /.48377779E+04,.44444367E-03,0.0,
     *    .60299986E+04,-.59999926E-02,0.0,-.20085164E+05,.2[illegible]69465E+00,
     *    -.61239208E-06,.3550809E+05,-.25325306E+00,.51263672E-06/
      DATA ((CDGNTS(I,J),I=1,3),J=1,4) /-.5301271E+04,.13931033E+00,
     *    -.47713912E-06,.31219505E+05,-.28877643E+00,.7771286E-06,
     *    .62921232E+04,-.16141039E-01,.31800356E-07,.45380057E+04,
     *    -.11600247E-02,0.0/
      DATA  CNLTS   /0.49576263E+04,0.49802542E-02,-0.12500668E-07/
      DATA  CNLNTS   /0.51179347E+04,0.3339158E-02,-0.80372549E-08/
      DATA ((RANGE(I,J),I=1,4),J=1,2) /185000.,205000.,220000.,240000.,
     *                                 170000.,185000.,220000.,240000./
C
      IF (JMONTH .GE. 4 .AND. JMONTH .LE. 10)  GO TO 100
      EVENL = CNLNTS(1) + CNLNTS(2)*IRFLOW + CNLNTS(3)*IRFLOW*IRFLOW
      DO 10 I=1,4
      IF(Q .LE. RANGE(I,2))GO TO 20
   10 CONTINUE
      DAYGN=4260.
      GO TO 30
   20 DAYGN=CDGNTS(1,I) + CDGNTS(2,I)*IRFLOW + CDGNTS(3,I)*IRFLOW**2
   30 EVEMWH=EVEMWH - EVENL
      DAYMWH = DAYMWH + DAYGN
      RETURN
  100 EVENL = CNLTS(1)+CNLTS(2)*IRFLOW+CNLTS(3)*IRFLOW*IRFLOW
      DO 110 I=1,4
      IF(Q .LE. RANGE(I,1))GO TO 120
  110 CONTINUE
      DAYGN=4260.
      GO TO 130
  120 DAYGN=CDGTS(1,I) + CDGTS(2,I)*IRFLOW + CDGTS(3,I)*IRFLOW**2
  130 EVEMWH=EVEMWH - EVENL
      DAYMWH = DAYMWH + DAYGN
      RETURN
      END

@HDG  ****** SUBDURPLT/          ******

@PRT.S  HSTG4*NIAG2.SUBDURPLT/
FURPUR 28R1.H2.6 E35 S74T11 06/11/81 10:17:49
```

```
NIAG2(1).SUBDURPLT(2)
      SUBROUTINE DURPLT(E,PER,K,TITL,AM,IYS,IYF)
C     PLOTTING ROUTINE FOR RESULTS-NOT TESTED AS OF NOV.13,1978 - NOT USED
      DIMENSION E(1202),PER(1202),TITL(2),AM(2)
      YEAR1=IYS+1900
      YEAR2=IYF+1900
      CALL PLOT(0.0,1.0,-3)
      CALL SYMBOL(0.0,0.0,.07,03,0.0,-1)
      CALL SYMBOL(0.0,11.69,.07,03,0.0,-1)
      CALL SYMBOL(16.54,11.69,.07,03,0.0,-1)
      CALL SYMBOL(16.54,0.0,.07,03,0.0,-1)
      CALL PLOT(1.0,.345,-3)
      CALL RECT(0.0,0.0,11.0,15.0,0.0,3)
      CALL SYMBOL(0.0,-0.5,.14,17HDURATION PLOT OF ,0.0,+17)
      CALL SYMBOL(999.,999.,.14,TITL,0.0,+12)
      CALL SYMBOL(999.,999.,.14,12H ENERGY FOR ,0.0,+12)
      CALL SYMBOL(999.,999.,.14,AM,0.0,+12)
      CALL NUMBER(999.,999.,.14,YEAR1,0.0,-1)
      CALL SYMBOL(999.,999.,.14,3H - ,0.0,+3)
      CALL NUMBER(999.,999.,.14,YEAR2,0.0,-1)
      CALL PLOT(1.0,1.0,-3)
      CALL PLOT(0.0,9.0,2)
      CALL PLOT(0.0,0.0,3)
      CALL PLOT(10.0,0.0,2)
      X=0.0
      DO 1 I=1,9
      Y=FLOAT(I)
      VAL=Y*200.
      CALL SYMBOL(X,Y,.07,03,0.0,-1)
      CALL NUMBER((X-.105),(Y-.105),.07,VAL,90.0,-1)
    1 CONTINUE
      CALL SYMBOL((Y-.5),4.0,.07,18HENERGY (*1000 MWH),90.0,+18)
      Y=0.0
      DO 2 I=1,10
      X=FLOAT(I)
      VAL=X*10.0
      CALL SYMBOL(X,Y,.07,03,0.0,-1)
      CALL NUMBER((X-.07),(Y-.15),.07,VAL,0.0,-1)
    2 CONTINUE
      CALL SYMBOL(4.75,(Y-.5),.07,15HPERCENT OF TIME,0.0,+15)
      CALL SYMBOL(999.,999.,.07,21H EQUALLED OR EXCEEDED,0.0,+21)
      NK=-K
      E(K+1)=0.0
      E(K+2)=200000.0
      PER(K+1)=0.0
      PER(K+2)=10.0
      CALL FLINE(PER,E,NK,1,0,0)
      CALL PLOT(15.0,-2.345,-3)
      RETURN
      END
```

```
****** SUBPGS/ ******
```

```
 HSTG4*NIAG2.SUBPGS/
28R1.M2.6 E35 S74111 06/11/81 10:17:49
```

```
HST64*NIAG2(1).SUBPGS(4)
      1            SUBROUTINE PGS(AVMW,ADJMW)
      2      C   CALCULATION OF PGS LOSS IN AVG. MW.
      3      C        AVMW=AV.MW. INPUT
      4      C        ADJMW=PGS LOSS
      5            DIMENSION C(6)
      6            DATA C0,(C(I),I=1,6)/-0.1671536,0.5288927,-0.3037727,
      7           1C.2435965,-0.5849167E-01,0.7305895E-02,-0.3621186E-03/
      8            X=(AVMW-500.)/100.
      9            A=C.0
     10            DO 1 I=1,6
     11      1     A=(A+C(7-I))*X
     12            A=C0+A
     13            ADJMW=20.+20.*A
     14            RETURN
     15            END

@HDG  ****** SUBSCHEME/ ******

/PRT,S  HST64*NIAG2.SUBSCHEME/
FURPUR 28R1.M2.6 E35 S74T11 06/11/81 10:17:50
```

```
HSTG4*NIAG2(1).SUBSCHEME(24)
      1            SUBROUTINE SCHEME(ZRQ,ISCH,QI,J,ITIME,XRQ)
      2      C     ADJUSTS L. ERIE CASE OUTFLOW ZRQ FOR L. ERIE REG. STUDY
      3      C     ADJUSTMENTS MADE FROM DISCHARGE INCREMENT QI TAKEN
      4      C     FROM SUBROUTINE "ADJUST"
      5      C     ADJUSTMENTS MADE TO BRING ZRQ TO APPROPRIATE VALUE
      6      C     CORRESPONDING TO CANADIAN TREATY HOURS
      7      C     ISCH IDENTIFIES WHICH SCHEME IS RUN
      8      C     ISCH=-1 FOR SE01552
      9      C     ISCH=0 FOR SE06L
     10      C     ISCH=1 FOR N25 AND BASE CASE
     11      C     ISCH=2 FOR ALL DIVERSIONS AND CONSUMPTIVE USES RUNS
     12            IF(QI.EQ.0.0)GO TO 89
     13            IF(ISCH.EQ.2)GO TO 89
     14            IF(ISCH)50,60,89
     15      50    IF(ITIME.EQ.0)GO TO 80
     16            XRQ=ZRQ+QI
     17            IF(J.GE.6.AND.J.LE.8)XRQ=ZRQ+(QI*0.8)
     18            IF(J.EQ.4)XRQ=(ZRQ+QI+QI/5+ZRQ+QI)/2
     19            IF(J.EQ.5)XRQ=ZRQ+QI+QI/5
     20            IF(J.EQ.11)XRQ=ZRQ+QI+QI/2
     21            IF(J.EQ.12)XRQ=(2+ZRQ+5+QI/2)/2
     22            IF(J.EQ.9)XRQ=ZRQ+QI+QI/11
     23            GO TO 99
     24      80    XRQ=ZRQ
     25            IF(J.GE.1.AND.J.LE.3)XRQ=ZRQ+QI
     26            IF(J.EQ.4.OR.J.EQ.12)XRQ=(ZRQ+2+QI)/2
     27            GO TO 99
     28      60    IF(ITIME.EQ.0)GO TO 90
     29            XRQ=ZRQ+QI
     30            IF(J.EQ.3)XRQ=(2+ZRQ+QI)/2
     31            IF(J.EQ.4)XRQ=(ZRQ+2+QI+QI/5)/2
     32            IF(J.EQ.5)XRQ=ZRQ+QI+QI/5
     33            IF(J.EQ.9)XRQ=ZRQ+QI+QI/11
     34            IF(J.EQ.11)XRQ=ZRQ+QI+QI/2
     35            IF(J.EQ.12)XRQ=(2+ZRQ+5+QI/2)/2
     36            IF(J.GE.6.AND.J.LE.8)XRQ=ZRQ+(QI*0.8)
     37            GO TO 99
     38      90    XRQ=ZRQ
     39            IF(J.EQ.1.OR.J.EQ.2)XRQ=ZRQ+QI
     40            IF(J.EQ.3.OR.J.EQ.12)XRQ=(ZRQ+(ZRQ+QI))/2
     41            GO TO 99
     42      89    XRQ=ZRQ
     43      99    RETURN
     44            END

$HDG ****** MAPLOAD/ ******

$PRT,S HSTG4*NIAG2.MAPLOAD/
FURPUR 2SR1.M2.6 E35 S74111 06/11/81 10:17:51
```

```
****** MAPLOAD/              ******                                                    DATE 061181        PAGE    26

HSTG4*NIAG2(1).MAPLOAD(28)
          @MAP,I ,NIAG2.LOAD
          LIB   SYS$*RLIES (IMAIN/SODD,DMAIN/SEVEN)
          DBANK,CM  DMAIN,017C00
          IN SYS$HYDRO*LIB.GETDAY
          IN NIAG2.LOAD
          IN NIAG2.SUBMONTH
          IN NIAG2.MWLZJ2
          IN NIAG2.SUBPEAK
          IN NIAG2.SUBDUR
          IN NIAG2.SUBTOTAL
          IN NIAG2.MWLZW1
          IN NIAG2.SUBSCHEME
          IN NIAG2.ADJUST
          IN NIAG2.SUBPGS
          IN NIAG2.SUBPOND
          IN NIAG2.SUBBHW
          IN NIAG2.SUBCAS
          IN NIAG2.SUBDEC
          IN BLANK$COMMON
          IBANK,M  IMAIN,01000
          FORM   DMAIN
          END

@HDG  ****** ADJUST/              ******

@PRT,S  HSTG4*NIAG2.ADJUST/
FURPUP 28R1.H2.6 E35 S74T11 06/11/81 10:17:51
```

-145-

```
HSTG4*NIAG2(1).ADJUST(24)
      1          SUBROUTINE SUBADJ(QERIE,ERIES,J,ISCH,QBASE,QINC,AST)
      2      C   DETERMINES BASE FLOW QBASE
      3      C   FLOW INCREMENT QINC AND FLAGS WITH "*"
      4      C   IF TRIGGER ON CONDITION IN L. ERIE OUTFLOW QERIE
      5      C   ISCH DETERMINES SCHEME AS DESCRIBED UNDER SUBROUTINE "SCHEME"
      6      C   BASE FLOW FORMULA SUPPLIED BY U. S. CORPS OF ENGINEERS
      7      C   ALTERED FOR RUNS R-10, R-11 IN DCU STUDY
      8          DIMENSION RIN(12),DIFS(12),DIFL(12),DIFX(12)
      9          DATA (RIN(K),K=1,12)/4.0,4.7,3.4,4.9,0.0,1.5,5.1,3.9,2.6,
     10         11.6,0.4,0.0/
     11          DATA (DIFL(K),K=1,12)/6800.,6800.,3400.,1700.,3400.,2300.,2300.,
     12         12300.,3400.,3400.,3400.,5100./
     13          DATA (DIFS(K),K=1,12)/15300.,15300.,15300.,15300.,11500.,7700.,
     14         15100.,5100.,5100.,7700.,7700.,7700.,11500./
     15          DATA (DIFX(K),K=1,12)/0.,0.,0.,0.,0.,0.,0.,0.,
     16         10.,0.,0.,0./
     17          QBASE=((ERIES-556.25)**1.5*3.665-RIN(J)*7.)*1000.
     18          DIF=QERIE-QBASE
     19      C   WRITE(6,52)DIF,ISCH
     20      C   IF(DIF.LE.10)C,OR,ISCH.EQ.1)GO TO 10
     21      C   TESTS DIFFERENCE FOR R-10, R-11 RUNS IN DIVERSION AND
     22      C   CONSUMPTIVE USES STUDY
     23          IF(DIF.GT.1000..AND.ISCH.EQ.2)GO TO 40
     24          IF(ISCH.EQ.1)GO TO 10
     25          IF(ISCH.EQ.2)GO TO 10
     26          IF(ISCH.EQ.-1)GO TO 20
     27          QINC=6300.
     28          QBASE=QERIE-DIFL(J)
     29      C   WRITE(6,52)QBASE,QINC,DIFL(J),QERIE
     30          AST="*"
     31          GO TO 99
     32     10   QBASE=QERIE
     33          QINC=0.
     34          AST=" "
     35          GO TO 99
     36     40   QBASE=QERIE
     37          QINC=0.
     38          AST="*"
     39          GO TO 99
     40     20   QINC=15300.
     41          QBASE=QERIE-DIFS(J)
     42          AST="*"
     43      C   WRITE(6,52)QBASE
     44      C   FORMAT()
     45     99   RETURN
     46          END

@HDG  ****** LOAD/ ******

@PRT,S  HSTG4*NIAG2.LOAD/
FURPUR 28R1.M2.6 E35 S74T11 06/11/81 10:17:52
```

```
HSTG4*NIAG2(1).LOAD(44)
    1          COMPILER (XM=1)
    2     C     *** NIAGARA ENERGY PROGRAMME ***
    3     C     MAIN EXECUTABLE PROGRAMME
    4     C     * VERSION REQUIRED FOR RUNS R=10, R=11 IN DCU STUDY *
    5     C     INPUT DATA FILE CONSISTS OF:
    6     C     LINE 1: STU: STUDY NAME, NO1: STUDY NUMBER,
    7     C                NO2: SECOND PART OF STUDY NO.(MAX. 6 ALPHANUMERIC CHARACTERS)
    8     C     LINE2: REPORT #,ITW=0-NO L. ONT. ELEV.,ITW=1-READ L.ONT.ELEV.
    9     C       PLOT NUMBER,1=NO PLOT,0=ACTIVATE PLOT.
   10     C     START MONTH,END MONTH,SCHEME FLAG, CAN-US  FLOW DIVERSION CONSTANT
   11     C     LINE 3: DISCHARGE FALLS DAYTIME (12 VALUES)
   12     C   LINE 4: DISCHARGE FALLS NIGHTIME (12 VALUES)
   13     C   LINE 5: LAKE ERIE ADJUSTMENTS (12 VALUES)
   14     C   LINE 6: MATERIAL DOCK ELEVATIONS (12 VALUES)
   15     C   LINE 7: TO END: YEAR/MONTH,ELEVATIONS (FT.),DISCHARGE (1000'S CFS.)
   16     C     OUTPUT BASED ON 7 REPORT TABLES
   17     C     REPORT 1: A)FLOWN TABLE SUMMARY
   18     C               B)PLANT ENERGY (MWH) TABLE SUMMARY
   19     C     REPORT 2: 1.A) PLUS B)PEAK PROGRAM CALL
   20     C          LAKE ERIE REGULATION STUDY AND DIVERSION AND CONSUMPTIVE
   21     C          USES STUDY ARE ALL REPORT 2 OUTPUTS
   22     C     REPORT 3: 1.A) PLUS B)ANNUAL TOTAL DURATION
   23     C               C)DURATION BY STATION BY MONTH
   24     C     REPORT 4: 1.A),1.B),PLUS C)MONTHLY DAYTIME DURATION
   25     C               D)MONTHLY NIGHTIME DURATION
   26     C               E)MONTHLY TOTAL DURATION
   27     C               F)ANNUAL DAYTIME TOTAL DURATION
   28     C               G)ANNUAL NIGHTIME TOTAL DURATION
   29     C               H)ANNUAL TOTAL DURATION
   30     C     REPORT 5: 1.A) PLUS B)STS ENERGY DATA FILE DUMP PLUS 3.C)
   31     C     REPORT 6: A)OVERALL MONTHLY FLOW DURATION STUDY
   32     C               B)FLOW DURATION BY MONTHS
   33     C               C)TOURIST SEASON FLOW DURATION
   34     C               D)NON-TOURIST FLOW DURATION
   35     C     REPORT 7: A)LAKE ERIE ELEV. DURATION BY MONTHS
   36     C               B)OVERALL ELEV. DURATION
   37     C               C)NAVIGATION SEASON ELEV. DURATION
   38          DIMENSION EBD(100,12),EOPD(100,12),ECNPD(100,12),ETOTD(100,12)
   39          DIMENSION EBN(100,12),EOPN(100,12),ECNPN(100,12),ETOTN(100,12)
   40          DIMENSION EDD(100,12),EDN(100,12),ETOTM(100,12),TITL(2),AM(2)
   41          DIMENSION RQ(100,12),EMD(12),US(1200)
   42          DIMENSION IDATE(2),ETOTY(100),IY(100),ADJ(12)
   43          DIMENSION HELE(100,12),ETOTYD(100),ETOTYN(100)
   44          DIMENSION QFS(12),MASTER(100,12),MASTER(100),IMDG(4)
   45          DIMENSION END1(100,12),ENB1(100,12),ENOP1(100,12),ENCN1(100,12)
   46          DIMENSION ETOT1(100,12),QFD(12),XLER(100,12)
   47          DIMENSION QGIP(100,12)
   48          DIMENSION RELET(1200),IYT(1200),RNAV(1200),IYNAV(1200),
   49         1RNON(1200),IYNON(1200)
   50          DIMENSION RQT(1200),ELVONT(100,12),EOPND(100,12),EOPNN(100,12),
   51         1RQTR(1200),IYRGTR(1200),RQNTR(1200),IYRQNT(1200)
   52          DIMENSION M1(1200),M2(1200),M3(1200),M4(1200),M5(1200)
   53          COMMON QBAC(100,12),QBECK(100,12),DISDEC(100,12),
   54         1POP(100,12),PCNP(100,12),PDEC(100,12),PBK(100,12),
   55         1PTOT(100,12),PTOTA(100,12),P(1200),S(1200),MOR(1200)
   56          COMMON MM(12,100,3)
```

```
      CALL GETDAY(IDATE)
      LP=1
      IX=1
      INGN=0
      INAV=0
      ITR=0
      INTR=0
      IFLAG=0
      PD=0.
      PN=0.
C      READ DATA FILE PARAMETERS
      READ(5,711)IHDG
711   FORMAT(1X,6A4)
      READ(5,500) IR,ITW,IP,MS,MF,ISCH,VAR1
      READ(5,500)(QFD(I),I=1,12)
      READ(5,500)(QFN(I),I=1,12)
      READ(5,500)(ADJ(I),I=1,12)
      READ(5,500) (END(I),I=1,12)
      Z1='
      Z2='
      IF(IR.EQ.0.OR.IR.GT.7) GO TO 28
      GO TO 29
28    IR=1
      Z1='RESET '
29    IF(IP.EQ.0.OR.IP.GT.5) GO TO 36
      GO TO 37
36    IP=1
      Z2='RESET '
C      WRITE INITIAL TITLES & DATA BLOCK
37    WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,211)IR,Z1,IP,Z2,(QFD(N),N=1,12),(QFN(N),N=1,12),
     1(ADJ(N),N=1,12),(END(N),N=1,12)
      LP=LP+1
      NOY=0
15    NOY=NOY+1
      READ(5,100,END=99) IY(NOY),MON1,(RELE(NOY,J),RQ(NOY,J),J=MON1,6)
C     WRITE(6,500) IY(NOY),MON1,(RQ(NOY,J),J=MON1,6)
      READ(5,100) IY(NOY),MON2,(RELE(NOY,J),RQ(NOY,J),J=MON2,12)
C     WRITE(6,500) IY(NOY),MON2,(RQ(NOY,J),J=MON2,12)
      GO TO 15
99    NOY=NOY-1
      MON1=1
      IF(ITW.EQ.0)GO TO 947
      DO 946 I=1,NOY
946   READ(10,322,END=947)(ELVONT(I,J),J=1,12)
C     WRITE(6,500)((I,J,NOY,ELVONT(I,J),J=1,12),I=1,NOY)
947   IYS=IY(1)
      IYEAR1=IYS+1900
      IYF=IY(NOY)
C      CALCULATE FLOWS AND AV. MW. FOR EACH STATION
      DO 20 I=1,NOY
      WRITE(6,220)IHDG,IDATE,LP
      LP=LP+1
      WRITE(6,200)
12    DO 21 J=MS,MF
      RQ(I,J)=RQ(I,J)*10.
      QIN=RQ(I,J)
```

```
      XLER(I,J)=RQ(I,J)
      ERIES=RELE(I,J)
      CALL SUBADJ(QIIV,ERIES,J,ISCH,BASE,XINC,ASTER(I,J))
      ITIME=1
C       SETS UP DAYTIME/NIGHTIME ROUTINE,ITIME=0 FOR DAY,1 FOR NIGHT
14    CALL SCHEME(BASE,ISCH,XINC,J,ITIME,QRES)
      RQ(I,J)=QRES
      IF(ITIME.EQ.0) TIME="D"
      IF(ITIME.EQ.1) TIME="N"
      IF(J.LT.4.OR.J.GT.10) GO TO 5
      TOUR=" T"
      GO TO 6
5     TOUR="NT"
C     WRITE(6,4)J,TOUR
C     FORMAT(1CX,I2,5X,A2)
6     IYEAR=IY(I)
      CALL QDEC(RELE(I,J),J,DEC)
      IF(ISCH.EQ.2.AND.ASTER(I,J).EQ."*")DEC=6800+2000.
      IF(ISCH.EQ.2.AND.ASTER(I,J).EQ."*")XLER(I,J)=RQ(I,J)
      IF(DEC.GT.6800.)DEC=6800.
      DISDEC(I,J)=DEC
      CALL MONTH(J,IYEAR,MD,AM)
      QGIP(I,J)=RQ(I,J)-ADJ(J)-DEC
      QLEA=RQ(I,J)-ADJ(J)
      IF(ITIME.EQ.0) QF=QFD(J)
      IF(ITIME.EQ.1) QF=QFN(J)
      QP=RQ(I,J)-QF-ADJ(J)
      QCA=(QP/2.0)+VAR1/2.
      QUS=(QP/2.0)-VAR1/2.
      IF(QUS.GT.102000.)QUS=102000.
C     WRITE(6,500) QCA,QUS,QP
      IF(J.LT.4.OR.J.GT.10) GO TO 10
      IF(ITIME.EQ.1) QCA=QCA+PD
10    QBC=QCA-DEC
      IF(ITIME.EQ.0)QBAC(I,J)=QBC
      CALL BHV(QBC,END(J),J,QB,HW)
      QC=QBC-QE
      TW=245.
      IF(ITW.EQ.1)TW=ELVONT(I,J)
      QT=2CA+QUS+QF
C     WRITE(6,500) QT,QCA,QUS,QF
C     QT=QGIP
2     TW=TW+.1
      IF(ITW.EQ.0)Q=((((TW+244.5)/2)-225.256)
     1*(SQRT(TW-244.5)))/.00020166
      IF(ITW.EQ.1)Q=((((TW+ELVONT(I,J))/2)-225.256)*
     1(SQRT(TW-ELVONT(I,J))))/.00020166
C     WRITE(6,500) TW,QT,Q
      IF(TW.GT.254.) WRITE(6,503) TW
      IF(TW.GT.254.) GO TO 999
      IF(Q.LT.QT) GO TO 3
      QUP=Q
      GO TO 7
3     QLOW=Q
      TWL=TW
      GO TO 2
7     TW=TWL+((0.1/(QUP-QLOW))*(QT-QLOW))
```

```
      C     WRITE(6,500) QUP,QT,QLOW,TWL
            HB=HW-TW
            CALL  CAS(4C,J,ENDR,ITIME,QP,QBA,QOP,QCNP)
            IF(ITIME.EQ.0)QBECK(I,J)=QBA
            IF(QBA.EQ.QB) GO TO 9
            CALL BHW(QBA,END(J),J,QB,HWA)
            HB=HWA-TW
    9       IF(QCNP.GT.9900.0)QCNP=9900.0
            IF(J.LT.4.OR.J.GT.10.OR.ITIME.EQ.0.OR.IFLAG.EQ.1)GO TO 810
            CALL POND(QOP,QCA,PD,PN,IFLAG)
            GO TO 10
  810       IF(J.LT.4.AND.QCNP.GT.1000.)QCNP=1000.
            IFLAG=0
            IF(ITIME.EQ.1) GO TO 13
            EDD(I,J)=(131./6430.)*DEC
            EBD(I,J)=(((22./291.)*HB)*QBA)/1000
            EOPD(I,J)=(QOP*12.6)/1000
            ECNPD(I,J)=(QCNP*7.6)/1000
            ETOTD(I,J)=EBD(I,J)+EOPD(I,J)+ECNPD(I,J)+EDD(I,J)
      C      OUTPUT FLOWS & AVE. HW. FOR DAYTIME HOURS
            WRITE(6,201)IY(I),AM(1),TOUR,TIME,RQ(I,J),QLEA,QGIP(I,J),
     1QCA,QUS,DEC,QBC,QBA,QOP,QCNP,EDD(I,J),EBD(I,J),EOPD(I,J),
     1ECNPD(I,J),ETOTD(I,J)
            WRITE(6,502)
    26      GO TO 820
    13      EDN(I,J)=(131./6430.)*DEC
            EBN(I,J)=(((22./291.)*HB)*QBA)/1000
            EOPN(I,J)=(QOP*12.6)/1000
            ECNPN(I,J)=(QCNP*7.6)/1000
            ETOTN(I,J)=EBN(I,J)+EOPN(I,J)+ECNPN(I,J)+EDN(I,J)
      C      OUTPUT FLOWS & AVE. HW. FOR NIGHTIME HOURS
            WRITE(6,201)IY(I),AM(1),TOUR,TIME,RQ(I,J),QLEA,QGIP(I,J),
     1QCA,QUS,DEC,QBC,QBA,QOP,QCNP,EDN(I,J),EBN(I,J),EOPN(I,J),
     1ECNPN(I,J),ETOTN(I,J)
    22      ITIME=0
            GO TO 14
  820       IF(IR.LT.6)GO TO 21
      C      SET UP PARAMETERS FOR FLOW & ELEVATION DURATION REPORTS
            IX=IX+1
            RELET(IX)=RELE(I,J)
            RQT(IX)=XLER(I,J)
            M1(IX)=J
            IYT(IX)=IY(I)
            IF(J.GE.4)GO TO 640
            INON=INON+1
            RNON(INON)=RELE(I,J)
            M2(INON)=J
            IYNON(INON)=IY(I)
            GO TO 671
  640       INAV=INAV+1
            RNAV(INAV)=RELE(I,J)
            M3(INAV)=J
            IYNAV(INAV)=IY(I)
  671       IF(J.LT.4.OR.J.GT.10)GO TO 670
            ITR=ITR+1
            RQTR(ITR)=XLER(I,J)
            M4(ITR)=J
```

```
      IYRQTR(ITR)=IY(I)
      GO TO 21
  670 INTR=INTR+1
      RQNTR(INTR)=XLER(I,J)
      MS(INTR)=J
      IYRQNT(INTR)=IY(I)
   21 CONTINUE
      IMS=1
   20 CONTINUE
      IF(IR.EQ.6)GO TO 551
      IF(IR.EQ.7)GO TO 950
C          ********************
C          ENERGY CALCULATIONS
C          ********************
      IMS=MS
      DO 30 I=1,NOY
      GO TO (24,23,23,24,23,24,23),IR
   24 WRITE(6,220)IMDG,IDATE,LP
      LP=LP+1
      WRITE(6,203)
   23 DO 31 J=MS,MF
      IYEAR=I
      CALL MONTH(J,IYEAR,MD,AM)
      IF(J.LT.4.OR.J.GT.10)GO TO 32
      IF(J.EQ.9)GO TO 33
      IF(J.EQ.10)GO TO 34
      F1=14.
      F2=2.
      F3=8.
      GO TO 35
   32 F1=16.
      F2=0.
      F3=8.
      GO TO 35
   33 F1=13.
      F2=3.
      F3=8.
      GO TO 35
   34 F1=12.
      F2=4.
      F3=8.
   35 EDD(I,J)=((F1*EDD(I,J))+(F2*EDN(I,J)))*MD
      EDN(I,J)=F3*EDN(I,J)*MD
      EBD(I,J)=((F1*EBD(I,J))+(F2*EBN(I,J)))*MD
      EBN(I,J)=F3*EBN(I,J)*MD
      EOPD(I,J)=((F1*EOPD(I,J))+(F2*EOPN(I,J)))*MD
      EOPN(I,J)=F3*EOPN(I,J)*MD
      ECNPD(I,J)=((F1*ECNPD(I,J))+(F2*ECNPN(I,J)))*MD
      ECAPN(I,J)=F3*ECAPN(I,J)*MD
      ETOTD(I,J)=EDD(I,J)+EBD(I,J)+EOPD(I,J)+ECNPD(I,J)
      ETOTN(I,J)=EDN(I,J)+EBN(I,J)+EOPN(I,J)+ECNPN(I,J)
      DMWH=ETOTD(I,J)/MD
      EMWH=ETOTN(I,J)/MD
      CALL PGST(DMWH,EMWH,QGEP(I,J),J)
      EOPMD(I,J)=DMWH/16.
      EOPMN(I,J)=EMWH/8.
      ETOTM(I,J)=(DMWH+EMWH)*MD
```

```
285             ETOTYD(I)=ETOTYD(I)+DMWH*MD
286             ETOTYN(I)=ETOTYN(I)+EMWH*MD
287             ETOTY(I)=ETOTY(I)+ETOTM(I,J)
288             END1(I,J)=(EDD(I,J)+EDN(I,J))/(MD*24.)
289             ENB1(I,J)=(EBD(I,J)+EBN(I,J))/(MD*24.)
290             CALL PGS(EN91(I,J),XLOSS)
291             ENB1(I,J)=EN91(I,J)-XLOSS
292             ENOP1(I,J)=(EOPD(I,J)+EOPN(I,J))/(MD*24.)
293             ENCN1(I,J)=(ECNPD(I,J)+ECNPN(I,J))/(MD*24.)
294             ETOT1(I,J)=ENB1(I,J)+END1(I,J)+ENOF1(I,J)+ENCN1(I,J)-75.24
295             GO TO (18,31,31,18,715,18,31),IR
296       18    WRITE(6,20) IY(I),AM(1),EDD(I,J),EBD(I,J),EOPD(I,J),ECNPD(I,J),
297            1ETOTD(I,J)
298             WRITE(6,204) IY(I),AM(1),EDN(I,J),EBN(I,J),EOPN(I,J),ECNPN(I,J),
299            1ETOTN(I,J),ETOT*(I,J)
300             WRITE(6,502)
301             GO TO 31
302       715   CALL PEAK(NOY,MS,MF)
303             WRITE(15,710)IY(I),J,END1(I,J)
304             WRITE(16,710)IY(I),J,ENB1(I,J)
305             WRITE(17,710)IY(I),J,ENOP1(I,J)
306             WRITE(18,710)IY(I),J,ENCN1(I,J)
307             WRITE(19,710)IY(I),J,ETOT1(I,J)
308             WRITE(20,710)IY(I),J,POP(I,J)
309             WRITE(21,710)IY(I),J,PCNP(I,J)
310             WRITE(22,710)IY(I),J,PBK(I,J)
311             WRITE(23,710)IY(I),J,PDEC(I,J)
312             WRITE(24,710)IY(I),J,PTOTA(I,J)
313       31    CONTINUE
314             IMS=1
315       30    CONTINUE
316             IF(IR.EQ.6.OR.IR.EQ.2)GO TO 551
317             GO TO 713
318       C     ************************************************
319       C       MONTHLY TOTAL FLOW DURATION
320       C     ************************************************
321       551   DO 552 J=MS,MF
322             I=0
323             DO 553 M=1,NOY
324             I=I+1
325             US(I)=XLER(M,J)
326             MASTER(I)=ASTER(I,J)
327       553   CONTINUE
328             N5=1
329             A5=1
330             CALL DUR(US,I,IYS,N9,N5,VAL,VAL5)
331             TITL(1)=' MONTH'
332             TITL(2)='LY'
333             LC=50
334             ACV=0.0
335             CALL MONTH(J,C,MB,AM)
336             DO 554 K=1,I
337             LC=LC+1
338             IF(LC.LE.42)GO TO 511
339             WRITE(6,220)IHDR,IDATE,LP
340             WRITE(6,556)(TITL(N),N=1,2),(AM(N),N=1,2)
341             LP=LP+1
```

```
      LC=0
  511 N=MOR(K)
      ACV=ACV+XLER(N,J)
      WRITE(6,333)IY(N),S(K),MASTER(N),ACV,P(K)
  554 CONTINUE
  552 CONTINUE
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,321)
  556 FORMAT(15X,'DURATION LISTING OF',2A6,' OVERALL'
     1' DISCHARGE (CFS) FOR ',2A6,///,
     12X,'YEAR          DISCHARGE    ACCUMULATED       PERCENT',
     1' OF TIME',/,18X,'(CFS)',9X,'VALUE',7X,
     1'EQUALLED OR EXCEEDED',/,2X,'-----',10X,9('-'),4X,
     111('-'),7X,20('-'),//)
  321 FORMAT(1H1,'****MONTHLY TOTAL FLOW DURATION COMPLETED***')
      IF(IR.EQ.2)GO TO 713
C      *******OVERALL FLOW DUPATION*******
      N5=1
      N9=1
      CALL DUR(RQT,IX,IYS,N9,N5,VAL,VAL5)
      AM(1)=' OVER'
      AM(2)='ALL '
      LC=50
      ACV=0.0
      DO 692 L=1,IX
      LC=LC+1
      IF(LC.LE.42)GO TO 772
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,672)(AM(N),N=1,2)
      LP=LP+1
      LC=0
  772 N=MOR(L)
      ACV=ACV+RQT(N)
      WRITE(6,696)IYT(N),M1(N),S(L),ACV,P(L)
  692 CONTINUE
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,673)
      LP=LP+1
      IF(IR.EQ.2)GO TO 713
C      ********TOURIST SEASON FLOW DURATION********
      N5=1
      N9=1
      CALL DUR(RQTR,ITR,IYS,N9,N5,VAL,VAL5)
      AM(1)='  TOUR'
      AM(2)='IST  '
      LC=50
      ACV=0.0
      DO 680 K=1,ITR
      LC=LC+1
      IF(LC.LE.42)GO TO 681
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,672)(AM(N),N=1,2)
      LP=LP+1
      LC=0
  681 N=MOR(K)
      ACV=ACV+RQTR(N)
      WRITE(6,696)IYRQTR(N),M6(N),S(K),ACV,P(K)
```

```
      680   CONTINUE
            WRITE(6,220)IHDG,IDATE,LP
            WRITE(6,683)
            LP=LP+1
      C     *********NON-TOURIST SEASON FLOW DURATION****
            N5=1
            N9=1
            CALL DUR(RQNTR,INTR,IYS,N9,N5,VAL,VAL5)
            AM(1)='NON-TO'
            AM(2)='URIST '
            LC=50
            ACV=0.0
            DO 690 K=1,INTR
            LC=LC+1
            IF(LC.LE.42)GO TO 691
            WRITE(6,220)IHDG,IDATE,LP
            WRITE(6,672)(AM(N),N=1,2)
            LP=LP+1
            LC=0
      691   N=MOR(K)
            ACV=ACV+RQNTR(N)
            WRITE(6,696)IYRQNT(N),MS(N),S(K),ACV,P(K)
      690   CONTINUE
            WRITE(6,220)IHDG,IDATE,LP
            WRITE(6,693)
            LP=LP+1
            IF(IR.EQ.6)GO TO 999
      C     IF(IP.NE.1) CALL PLOTS(DUM1,DUM2,15)
      713   GO TO (999,888,72,70,370,70,370),IR
      C      ***************************
      C      PEAK CALCULATIONS AND REPORT
      C      ***************************
      888   CALL PEAK(NOY,MS,MF)
            LC=39
            DO 601 I=1,NOY
            IYEAR=IY(I)
            DO 602 J=MS,MF
            LC=LC+1
            CALL MONTH(J,IYEAR,MD,AM)
            IF(LC.GE.40)GO TO 603
            GO TO 604
      603   WRITE(6,220)IHDG,IDATE,LP
            WRITE(6,608)
            LC=0
            LP=LP+1
      604   WRITE(6,606)IY(I),AM(1),POP(I,J),PCNP(I,J),PDEC(I,J),
           1PBK(I,J),PTOT(I,J),PTOTA(I,J)
      602   CONTINUE
      601   CONTINUE
            WRITE(6,220)IHDG,IDATE,LP
            LP=LP+1
      C           ****************************
      C           MONTHLY  DURATION FOR PEAK
      C           ****************************
            DO 540 J=MS,MF
            I=0
            DO 541 M=1,NOY
```

```
      I=I+1
      US(I)=PTOT(M,J)
  541  CONTINUE
      N5=1
      N9=1
      CALL DUR(US,I,IYS,N9,N5,VAL,VAL5)
      TITL(1)='  OVER'
      TITL(2)='ALL'
      LC=50
      ACV=0.0
      CALL MONTH(J,0,MD,AM)
      DO 542 K=1,I
      LC=LC+1
      IF(LC.LE.42) GO TO 543
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,521) (TITL(N),N=1,2),(AM(N),N=1,2)
      LP=LP+1
      LC=0
  543  N=MOR(K)
      ACV=ACV+PTOT(N,J)
      WRITE(6,208) IY(N),S(K),ACV,P(K)
  542  CONTINUE
C     GO TO (61,73,61,61,73),IP
C     CALL DURPLT(S,P,I,TITL,AM,IYS,IYF)
  540  CONTINUE
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,201)
      LP=LP+1
      WRITE(6,607)
      IF(IR.EQ.2)GO TO 70
      GO TO 999
  606  FORMAT(1X,'19',I2,1X,A3,1X,5F14.2,F18.2)
  608  FORMAT(1H1,'NIAGARA AREA (ONTARIO)',/,38X,22('-'),///,
     1' YEAR/MONTH',4X,'O.P. PEAK',5X,'CAP. PEAK',4X,'DECEW PEAK',
     15X,'BECK PEAK',9X,'TOTAL',4X,'ADJUSTED TOTAL',/,17X,'(MW)',
     110X,'(MW)',13X,'(MW)',10X,'(MW)',13X,'(MW)',3X,'(TOTAL-75MW)',
     1/,10('-'),5X,9('-'),5X,9('-'),4X,10('-'),5X,9('-'),9X,5('-'),
     1+X,15('-'),//)
  607  FORMAT('*** PEAK PROGRAM COMPLETED**,*')
C          ***************************
C          MONTHLY  DAYTIME DURATION FOR ENERGY
C          ***************************
  70   DO 61 J=MS,MF
      I=0
      DO 62 M=1,NOY
      I=I+1
      US(I)=EOPHD(M,J)
  62   CONTINUE
      N5=1
      N9=1
      CALL DUR(US,I,IYS,N9,N5,VAL,VAL5)
      TITL(1)='  DAYT'
      TITL(2)='IME'
      LC=50
      ACV=0.0
      CALL MONTH(J,0,MD,AM)
      DO 51 K=1,I
```

```
      LC=LC+1
      IF(LC.LE.42) GO TO 50
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,207) (TITL(N),N=1,2),(AM(N),N=1,2)
      LP=LP+1
      LC=0
50    M=MOR(K)
      ACV=ACV+EOPMD(M,J)
      WRITE(6,208) IY(M),S(K),ACV,P(K)
51    CONTINUE
C     GO TO (61,73,61,61,73),IP
C     CALL DUPPLT(S,P,I,TITL,AM,IYS,IYF)
61    CONTINUE
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,301)
      LP=LP+1
C          ****************************
C          MONTHLY NIGHTTIME DURATION
C          ****************************
      DO 63 J=MS,MF
      I=0
      DO 64 M=1,NOY
      I=I+1
      US(I)=EOPMN(M,J)
64    CONTINUE
      N5=1
      N9=1
      CALL DUR(US,I,IYS,N9,N5,VAL,VAL5)
      TITL(1)='NIGHTT'
      TITL(2)='IME'
      LC=50
      ACV=0.0
      CALL MONTH(J,C,MD,AM)
      DO 52 K=1,1
      LC=LC+1
      IF(LC.LE.42) GO TO 53
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,207) (TITL(N),N=1,2),(AM(N),N=1,2)
      LP=LP+1
      LC=0
53    M=MOR(K)
      ACV=ACV+EOPMN(M,J)
      WRITE(6,208) IY(M),S(K),ACV,P(K)
52    CONTINUE
C     GO TO (67,74,63,63,74),IP
C     CALL DUPPLT(S,P,I,TITL,AM,IYS,IYF)
63    CONTINUE
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,302)
      LP=LP+1
      IF(IR.EQ.4.OR.IR.EQ.2) GO TO 71
      GO TO 999
C          **********************
C          MONTHLY TOTAL DURATION
C          **********************
71    DO 65 J=MS,MF
      I=0
```

```
      DO 66 M=1,NOY
      I=I+1
      US(I)=EOPHD(N,J)+EOPHN(M,J)
   66 CONTINUE
      N5=1
      N9=1
      CALL DUR(US,I,IYS,N9,N5,VAL,VAL5)
      TITL(1)=" MONTH"
      TITL(2)="LY "
      LC=50
      ACV1=0.0
      ACV2=0.0
      ACV3=0.0
      CALL MONTH(J,0,MD,AM)
      DO 54 K=1,I
      LC=LC+1
      IF(LC.LE.42) GO TO 55
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,209) (TITL(N),N=1,2),(AM(N),N=1,2)
      LP=LP+1
      LC=0
   55 N=NOR(K)
      ACV1=ACV1+EOPHD(N,J)
      ACV2=ACV2+EOPHN(N,J)
      ACV3=ACV3+EOPHD(N,J)+EOPHN(N,J)
      WRITE(6,210) IY(N),EOPHD(N,J),ACV1,EOPHN(N,J),ACV2,S(K),ACV3,P(K)
   54 CONTINUE
C     GO TO (65,65,75,65,75),IP
C     CALL DURPLT(S,P,I,TITL,AM,IYS,IYF)
   65 CONTINUE
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,300)
      LP=LP+1
      IF(IR.EQ.4.OR.IR.EQ.2) GO TO 390
      GO TO 999
C     ******************************
C     ANNUAL DAYTIME TOTAL DURATION
C     ******************************
  390 I=0
      DO 400 M=1,NOY
      I=I+1
      US(I)=ETOTYD(M)
  400 CONTINUE
      N5=1
      N9=1
      CALL DUR(US,I,IYS,N9,N5,VAL,VAL5)
      TITL(1)="ANNUAL"
      TITL(2)="DAY"
      LC=50
      ACV=0.0
      DO 410 K=1,I
      LC=LC+1
      IF(LC.LE.42) GO TO 420
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,250)(TITL(N),N=1,2)
      LP=LP+1
      LC=0
```

```
      420   N=MOR(K)
            ACV=ACV+ETOTYD(N)
            WRITE(6,208)IY(N),S(K),ACV,P(K)
      410   CONTINUE
            AVG=ACV/I
            WRITE(6,305)AVG
      C     GO TO (430,430,430,440,440),IP
      C     CALL DURPLT(S,P,I,TITL,AM,IYS,IYF)
      430   WRITE(6,220)IHDG,IDATE,LP
            WRITE(6,306)
            LP=LP+1
      C     ****************************
      C     ANNUAL NIGHTIME TOTAL DURATION
      C     ****************************
      490   I=0
            DO 800 N=1,NOY
            I=I+1
            US(I)=ETOTYN(N)
      800   CONTINUE
            N5=1
            N9=1
            CALL DUR(US,I,IYS,N9,N5,VAL,VAL5)
            TITL(1)="ANNUAL"
            TITL(2)="NIGHT"
            LC=50
            ACV=0.0
            DO 510 K=1,I
            LC=LC+1
            IF(LC.LE.42) GO TO 520
            WRITE(6,220)IHDG,IDATE,LP
            WRITE(6,250)(TITL(N),N=1,2)
            LP=LP+1
            LC=0
      520   N=MOR(K)
            ACV=ACV+ETOTYN(N)
            WRITE(6,208)IY(N),S(K),ACV,P(K)
      510   CONTINUE
            AVG=ACV/I
            WRITE(6,307)AVG
      C     GO TO (530,530,530,540,540),IP
      C     CALL DURPLT(S,P,I,TITL,AM,IYS,IYF)
      530   WRITE(6,220)IHDG,IDATE,LP
            WRITE(6,306)
            LP=LP+1
      C           ********************
      C           ANNUAL TOTAL DURATION
      C           ********************
      72          I=0
            DO 67 N=1,NOY
            I=I+1
            US(I)=ETOTY(N)
      67    CONTINUE
            N5=1
            N9=1
            CALL DUR(US,I,IYS,N9,N5,VAL,VAL5)
            TITL(1)="ANNUAL"
            TITL(2)="
```

```
      LC=50
      ACV=0.0
      DO 68 K=1,I
      LC=LC+1
      IF(LC.LE.42) GO TO 56
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,250) (TITL(N),N=1,2)
      LP=LP+1
      LC=5
56    N=NOR(K)
      ACV=ACV+ETOTY(N)
      WRITE(6,208) IY(N),S(K),ACV,P(K)
68    CONTINUE
      AVG=ACV/I
      WRITE(6,209) AVG
C     GO TO (77,77,77,76,76),IP
C     CALL DURPLT(S,P,I,TITL,AM,IYS,IYF)
77    WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,304)
      LP=LP+1
      IF(IR.EQ.4.OR.IR.EQ.2) GO TO 999
      GO TO 370
C     ************************************
C      DURATION BY STATION BY MONTH
C     ************************************
370   N9=0
      N5=0
      DO 103 K=1,5
      DO 105 J=MS,MF
      I=0
      DO 110 M=1,NOY
      I=I+1
      GO TO (115,120,125,130,426),K
115   US(I)=END1(M,J)
      GO TO 110
120   US(I)=END1(M,J)
      GO TO 110
125   US(I)=ENOP1(M,J)
      GO TO 110
130   US(I)=ENCN1(M,J)
      GO TO 110
426   US(I)=ETOT1(M,J)
110   CONTINUE
      CALL DUR(US,I,IYS,N9,N5,VAL,VAL50)
      TITL(1)=' MONTH'
      TITL(2)='LY'
      LC=50
      ACVD=0.0
      IYR=0
      CALL MONTH(J,IYR,MD,AM)
      DO 135 L=1,I
      LC=LC+1
      IF(LC.LE.42)GO TO 161
      WRITE(6,220)IHDG,IDATE,LP
      GO TO (140,145,150,155,156),K
140   STA='DECEM'
      WRITE(6,320)(TIT;(N),N=1,2),(AM(N),N=1,2),STA
```

```
      GO TO 160
  145 STA="B+PGS"
      WRITE(6,320)(TITL(N),N=1,2),(AM(N),N=1,2),STA
      GO TO 160
  150 STA=" O.P"
      WRITE(6,320)(TITL(N),N=1,2),(AM(N),N=1,2),STA
      GO TO 160
  155 STA=" CNP."
      WRITE(6,320)(TITL(N),N=1,2),(AM(N),N=1,2),STA
      GO TO 160
  156 STA="ALL-75"
      WRITE(6,320)(TITL(N),N=1,2),(AM(N),N=1,2),STA
  160 LP=LP+1
      LC=0
  161 N=MOR(L)
      GO TO (165,170,175,180,181),K
  165 ACVD=ACVD+END1(N,J)
      WRITE(6,208)IY(N),S(L),ACVD,P(L)
      GO TO 135
  170 ACVD=ACVD+EN_1(N,J)
      WRITE(6,208)IY(N),S(L),ACVD,P(L)
      GO TO 135
  175 ACVD=ACVD+ENOP1(N,J)
      WRITE(6,208)IY(N),S(L),ACVD,P(L)
      GO TO 135
  180 ACVD=ACVD+ENCN1(N,J)
      WRITE(6,208)IY(N),S(L),ACVD,P(L)
      GO TO 135
  181 ACVD=ACVD+ETOT1(N,J)
      WRITE(6,208)IY(N),S(L),ACVD,P(L)
  135 CONTINUE
      WRITE(6,360)VAL50,VAL
C     GO TO (105,105,105,362,362),IP
C     CALL DURPLT(S,P,I,TITL,AM,IYS,IYF)
  105 CONTINUE
  103 CONTINUE
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,365)
      LP=LP+1
      IF(IR.EQ.3)GO TO 999
C     ************************************
C      DURATION BY STATION BY MONTH FOR PEAK
C     ************************************
      N9=0
      N5=0
      DO 570 K=1,5
      DO 571 J=MS,MF
      I=0
      DO 572 M=1,NOY
      I=I+1
      GO TO (560,561,562,563,564),K
  560 US(I)=PDEC(M,J)
      GO TO 572
  561 US(I)=PPK(M,J)
      GO TO 572
  562 US(I)=POP(M,J)
      GO TO 572
```

```
      563   US(I)=PCNP(M,J)
            GO TO 572
      564   US(I)=PTOTA(M,J)
      572   CONTINUE
            CALL DUR(US,1,IYS,N9,N5,VAL,VAL50)
            TITL(1)=' MONTH'
            TITL(2)='LY'
            LC=50
            ACVD=0.0
            IYR=0
            CALL MONTH(J,IYR,MD,AM)
            DO 590 L=1,I
            LC=LC+1
            IF(LC.LE.42)GO TO 591
            WRITE(6,22))IMD6,IDATE,LP
            GO TO (592,593,594,595,596),K
      592   STA='DECEM'
            WRITE(6,599)(TITL(N),N=1,2),(AM(N),N=1,2),STA
            GO TO 580
      593   STA='BECK'
            WRITE(6,599)(TITL(N),N=1,2),(AM(N),N=1,2),STA
            GO TO 580
      594   STA=' O.P'
            WRITE(6,599)(TITL(N),N=1,2),(AM(N),N=1,2),STA
            GO TO 580
      595   STA=' CNP.'
            WRITE(6,599)(TITL(N),N=1,2),(AM(N),N=1,2),STA
            GO TO 580
      596   STA='ALL-75'
            WRITE(6,599)(TITL(N),N=1,2),(AM(N),N=1,2),STA
      580   LP=LP+1
            LC=0
      591   K=KOR(L)
            GO TO (531,532,533,534,535),K
      531   ACVD=ACVD+PDEC(N,J)
            WRITE(6,208)IY(N),S(L),ACVD,P(L)
            GO TO 590
      532   ACVD=ACVD+PBK(N,J)
            WRITE(6,208)IY(N),S(L),ACVD,P(L)
            GO TO 590
      533   ACVD=ACVD+POP(N,J)
            WRITE(6,208)IY(N),S(L),ACVD,P(L)
            GO TO 590
      534   ACVD=ACVD+PCNP(N,J)
            WRITE(6,208)IY(N),S(L),ACVD,P(L)
            GO TO 590
      535   ACVD=ACVD+PTOTA(N,J)
            WRITE(6,208)IY(N),S(L),ACVD,P(L)
      590   CONTINUE
            WRITE(6,360)VAL50,VAL
            GO TO (105,105,105,362,362),IP
      C     CALL DUMPLT(S,P,I,TITL,AM,IYS,IYF)
      571   CONTINUE
      570   CONTINUE
            WRITE(6,220)IMD6,IDATE,LP
            WRITE(6,365)
            LP=LP+1
```

```
      GO TO 999
C     ***MONTHLY ELEVATION DURATION***
950   DO 620 J=5,9F
      I=0
      DO 621 M=1,NOY
      I=I+1
      US(I)=RELE(M,J)
621   CONTINUE
      N5=1
      N9=1
      CALL DUP(US,I,IYS,N9,N5,VAL,VAL5)
      TITL(1)='  LAKE'
      TITL(2)='  ERIE'
      LC=50
      ACV=0.0
      CALL  MONTH(J,G,MD,AM)
      DO 771 K=1,I
      LC=LC+1
      IF(LC.LE.42)GO TO 622
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,624)(TITL(N),N=1,2),(AM(N),N=1,2)
      LP=LP+1
      LC=0
622   M=MOR(K)
      ACV=ACV+RELE(M,J)
      WRITE(6,203)IY(M),S(K),ACV,P(K)
771   CONTINUE
620   CONTINUE
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,626)
      LP=LP+1
C     ***OVERALL ELEVATION DURATION***
      N5=1
      N9=1
      CALL DUR(RELET,IX,IYS,N9,N5,VAL,VAL5)
      AM(1)='  OVER'
      AM(2)='-ALL  '
      LC=50
      ACV=0.0
      DO 630 K=1,IX
      LC=LC+1
      IF(LC.LE.42)GO TO 631
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,636)(AM(N),N=1,2)
      LP=LP+1
      LC=0
631   M=MOR(K)
      ACV=ACV+RELET(M)
      WRITE(6,696)IYT(M),M1(M),S(K),ACV,P(K)
630   CONTINUE
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,632)
      LP=LP+1
C     *****NAVIGATION SEASON ELEV. DURATION****
      N5=1
      N9=1
      CALL DUR(RNAV,INAV,IYS,N9,N5,VAL,VAL5)
```

-121-

```
      TITL(1)="NAVIG"
      TITL(2)="ATION "
      LC=50
      ACV=0.0
      DO 650 K=1,INAV
      LC=LC+1
      IF(LC.LE.42)GO TO 651
      WRITE(6,220)INDG,IDATE,LP
      WRITE(6,636)(TITL(N),N=1,2)
      LP=LP+1
      LC=0
651   N=NOR(K)
      ACV=ACV+RNAV(N)
      WRITE(6,696)IYNAV(N),M3(N),S(K),ACV,P(K)
650   CONTINUE
      WRITE(6,220)INDG,IDATE,LP
      WRITE(6,653)
      LP=LP+1
C     ***NON-NAVIGATION SEASON ELEV. DURATION****
      N5=1
      N9=1
      CALL DUR(RNON,INON,IYS,N9,N5,VAL,VAL5)
      TITL(1)="  NON-"
      TITL(2)="NAVIG "
      LC=50
      ACV=0.0
      DO 660 K=1,INON
      LC=LC+1
      IF(LC.LE.42)GO TO 661
      WRITE(6,223)INDG,IDATE,LP
      WRITE(6,636)(TITL(N),N=1,2)
      LP=LP+1
      LC=0
661   N=NOR(K)
      ACV=ACV+RNON(N)
      WRITE(6,696)IYNON(N),M2(N),S(K),ACV,P(K)
660   CONTINUE
      WRITE(6,220)INDG,IDATE,LP
      WRITE(6,663)
      LP=LP+1
999   IF(IR.EQ.2)CALL TOTAL(EOPMD,EOPNN,PTOT,NOY,MS,MF)
      IF(IP.EQ.2)CALL TWRITE(IYEAR1,NOY,INDG)
      STOP
710   FORMAT("19",2I2,5X,F12.2)
765   FORMAT(10X,"CHRONOLOGICAL LISTING OF-",/,
     110X,"(A) BECK + CASCADES DAYTIME DISCHARGE(CFS/1000)",/,
     110X,"(B) BECK DAYTIME DISCHARGE(CFS/1000)",///,
     110X,"YEAR      MONTH      BECK+CASC      BECK",/,
     122X,"CFS/1000",9X,"CFS/1000",/,10X,4("-"),6X,5("-"),
     16X,9("-"),6X,8("-"))
735   FORMAT(10X,"19",I2,8X,I2,8X,F7.0,10X,F7.0)
740   FORMAT("***CHRONOLOGICAL LIST OF DISCHARGE COMPLETE***")
930   FORMAT(15X,"DURATION LISTING OF ",A3,A4,2X,"DISCHARGE",
     1"(C.F.S./1000)",/,15X,"FOR ",2A6,/,
     115X,"STATION = ",A12,//,
     12X,"YEAR      DISCHARGE   ACCUMULATED      PERCENT",
     1" OF TIME",/,16X,"(CFS/1000)",6X,"VALUE",8X,"EQUALLED OR EXCEEDED"
```

```
      1,/,2X,'----',9X,10('-'),2X,13('-'),9X,6('-'),///)
  955 FORMAT('***DISCHARGE DURATION COMPLETED***')
  100 FORMAT(2X,I2,4X,6(F5.2,F5.0))
  101 FORMAT(I1,A1,2F6.0)
  701 FORMAT(1X,I1,A1,2F6.0)
  500 FORMAT()
  501 FORMAT(1H1)
  502 FORMAT(1X)
  200 FORMAT(37X,'FLOW IN CFS',48X,'CANADA ENERGY OUTPUT (AVE.MW.)',/,
     156X,'TREATY HOURS-NO PGS',/,15X,78('-'),2X,34('-'),/,
     11X,' YEAR/          LAKE   L.ERIE    TO       TO       TO',
     1'       TO    BECK &    TO       TO       TO     DECEW   BECK',
     1'    OP     CNP   TOTAL',/,1X,'   MONTH        ERIE   ADJUST',
     1'   GIP    CANADA    USA      DECEW CASCADES',
     1'  BECK     OP      CNP',/,
     11X,'---------      ',10('-------- '),5(' -------'),///)
  201 FORMAT(1X,'19',J2,1X,A3,1X,A2,A1,1X,10F8.0,5F7.1)
  202 FORMAT(I4,1X,A3,5F10.2)
  203 FORMAT(30X,'PLANT ENERGY (MWH)',///,
     115X,57('-'),/,
     11X,'YEAR/',11X,'DECEW',9X,'BECK',9X,'OP',9X,'CNP',8X,'TOTAL ',
     1'     MONTHLY',/,3X,'MONTH',6EX,'TOTAL',/,12X,6('    ---------'),///)
  204 FORMAT(1X,'19',J2,1X,A3,' N ',6F12.2)
  206 FORMAT(1X,'19',J2,1X,A3,' D ',5F12.2)
  333 FORMAT(2X,'19',J2,7X,F12.2,A1,2F15.2)
  208 FORMAT(2X,'19',J2,7X,F12.2,2F15.2)
  521 FORMAT(15X,'DURATION LISTING OF ',A6,A3,' PEAK FOR ',
     12A6,///,
     12X,'YEAR           PEAK       ACCUMULATED       PERCENT',
     1' OF TIME',/,17X,'      ',8X,'VALUE',8X,'EQUALLED OR EXCEEDED',/,
     12X,'----',9X,10('-'),2X,13('-'),9X,6('-'),///)
  207 FORMAT(15X,'DURATION LISTING OF ',A6,A3,' ENERGY FOR ',
     12A6,' (MW.-OP. HOURS)',///,
     12X,'YEAR           ENERGY     ACCUMULATED       PERCENT',
     1' OF TIME',/,17X,'(MW )',8X,'VALUE',8X,'EQUALLED OR EXCEEDED',/,
     12X,'----',9X,10('-'),2X,13('-'),9X,6('-'),///)
  210 FORMAT(2X,'19',J2,1X,3(F10.0,F13.0),F13.2)
  209 FORMAT(15X,'DURATION LISTING OF ',A6,A3,' ENERGY FOR ',
     12A6,' (MW.-OP. HOURS)',///,
     115X,'DAYTIME',16X,'NIGHTTIME',14X,'TOTAL',///,
     12X,'YEAR ',3(' ENERGY  ACCUMULATED'),'  PERCENT OF TIME',/,
     114X,3(' (MW )      VALUE'),6X,'EQUALLED OR EXCEEDED',/,
     117X,3(3X,'------',3X,11('-')),7X,'------',///)
  211 FORMAT(10X,'REPORT TYPE : ',J2,1X,A6,/,
     110X,'PLOT  TYPE : ',J2,1X,A6,///,
     110X,'FLOW OVER NIAGARA FALLS',/,
     110X,'DAYTIME FLOW BY MONTH (CFS)',/,10X,12F7.0,//,
     110X,'NIGHTIME FLOW BY MONTH (CFS)',/,10X,12F7.0,///,
     110X,'MONTHLY ADJUSTMENTS (CFS)',//,10X,12F7.0,///,
     110X,'MONTHLY MATERIAL DOCK ELEVATION  (FT)',//,10X,12F8.2,///)
  220 FORMAT(1H1,10X,4A4,5X,'NIAGARA AREA',
     1 2X,2A6,' PAGE : ',I3,///)
  300 FORMAT(' *** MONTHLY TOTAL DURATION AND/OR PLOT COMPLETED ***')
  301 FORMAT(' *** MONTHLY (D) DURATION AND/OR PLOT COMPLETED ***')
  302 FORMAT(' *** MONTHLY (N) DURATION AND/OR PLOT COMPLETED ***')
  303 FORMAT(1H1,'*** BECK TAIL WATER ELEVATION = ',F5.1)
  304 FORMAT(' *** ANNUAL DURATION AND/OR PLOT COMPLETED ***')
```

```
305   FORMAT(//,2X,'AVG.ANNUAL DAYTIME ENERGY=',2X,F15.2)
306   FORMAT('***ANNUAL DAYTIME DURATION AND/OR PLOT COMPLETED
     1***')
307   FORMAT(//,2X,'AVG.ANNUAL NIGHTIME ENERGY=',2X,F15.2)
308   FORMAT('***ANNUAL NIGHTIME DURATION AND/OR PLOT
     1COMPLETED***')
322   FORMAT(10X,12F5.2)
309   FORMAT(//,2X,'AVG.ANNUAL TOTAL ENERGY=',2X,F15.2)
250   FORMAT(5X,'DURATION LISTING OF ',A8,1X,A8,'TOTAL ENERGY',///,
     12X,'YEAR            ENERGY     ACCUMULATED       PERCENT',
     1' OF TIME',/,17X,'(MWH)',8X,'VALUE',8X,'EQUALLED OR EXCEEDED',/,
     12X,'----',9X,10('-'),2X,13('-'),9X,6('-'),//)
320   FORMAT(15X,'DURATION LISTING OF ',A6,A3,' ENERGY ',
     1'(AVE.MW-OPERATING HRS.)',/,15X,'FOR ',2A6,/,
     115X,'STATION = ',A12,//,
     12X,'YEAR            ENERGY     ACCUMULATED       PERCENT',
     1' OF TIME',/,16X,'(AVE.MW)',6X,'VALUE',8X,'EQUALLED OR EXCEEDED',/,
     12X,'----',9X,10('-'),2X,13('-'),9X,6('-'),//)
599   FORMAT(15X,'DURATION LISTING OF ',A6,A3,' PEAK ',
     1'(PEAK MW.)',/,15X,'FOR ',2A6,/,
     115X,'STATION = ',A12,//,
     12X,'YEAR            PEAK       ACCUMULATED       PERCENT',
     1' OF TIME',/,16X,'  (MW.) ',6X,'VALUE',8X,'EQUALLED OR EXCEEDED',/,
     12X,'----',9X,10('-'),2X,13('-'),9X,6('-'),//)
360   FORMAT(//,2X,'50% MID. INTERVAL VALUE=',F12.2,
     1//,2X,'98% MID. INTERVAL VALUE=',F12.2)
365   FORMAT('***STATION DURATION AND/OR
     1PLOT COMPLETED***')
696   FORMAT(2X,'19',J2,1X,I2,4X,F12.2,2F15.2)
672   FORMAT(15X,2A6,' FLOW DURATION',///,2X,'YEAR/MONTH   DISCHARGE',
     1'    ACCUMULATED        PERCENT',' OF TIME',/,17X,'(CFS)',8X,
     1'VALUE',8X,'EQUALLED OR EXCEEDED',/,2X,10('-'),3X,9('-'),
     14X,11('-'),7X,15('-'),//)
673   FORMAT('***OVERALL FLOW DURATION COMPLETED***')
683   FORMAT('***TOURIST SEASON FLOW DURATION COMPLETED***')
693   FORMAT('***NON-TOUR SEASON FLOW DURATION COMPLETED***')
624   FORMAT(15X,'DURATION LISTING OF',2A6,' OVERALL'
     1' ELEVATION (FT.) FOR ',2A6,///,
     12X,'YEAR            ELEVATION    ACCUMULATED       PERCENT',
     1' OF TIME',/,18X,'(FT.)',9X,'VALUE',7X,
     1'EQUALLED OR EXCEEDED',/,2X,'----',10X,9('-'),4X,
     111('-'),7X,20('-'),//)
636   FORMAT(15X,2A6,' ELEV. DURATION',///,2X,'YEAR/MONTH   ELEVATION',
     1'    ACCUMULATED        PERCENT',' OF TIME',/,17X,'(FT.)',8X,
     1'VALUE',8X,'EQUALLED OR EXCEEDED',/,2X,10('-'),3X,9('-'),
     14X,11('-'),7X,15('-'),//)
626   FORMAT('*** MONTHLY ELEVATION DURATION COMPLETED ***')
632   FORMAT('*** OVERALL ELEVATION DURATION COMPLETED ***')
653   FORMAT('*** NAVIGATION DURATION COMPLETED ***')
663   FORMAT('*** NON-NAV. DURATION COMPLETED ***')
      END
```

GHDG ****** SUBDEC/ ******

@PRT.S HSTG6*NIAG2.SUBDEC/

-165-

FURPUR 28R1.M2.6 E35 S74T11 06/11/81 10:17:53

```
HSTG4*NIAG2(1).SUBDEC(35)
      1            SUBROUTINE QDEC(RLE,MON,DQ)
      2      C     CALCULATION OF DISCHARGE FOR DECEW
      3      C     BASED ON LAKE ERIE ELEVATION AND MONTH AND WELLAND CANAL
      4      C     DIVERSION = 7000 CFS
      5            DIMENSION C(7),DQMAX(12)
      6            DATA CO,(C(I),I=1,7)/-0.1262018E+04,0.1575734E+04,-0.8390866E+03,
      7           10.2454287E+03,-0.4245535E+02,0.4345007E+01,-0.2438443,
      8           10.5795483E-02/
      9            DATA (DQMAX(J),J=1,12)/6500.,6800.,6800.,6800.,6800.,
     10           16800.,6800.,6800.,6800.,6800.,6800.,6800./
     11            IF(MON.GE.4)GO TO 20
     12            DQ=(RLE-566.36)/3.111111E-04
     13            GO TO 30
     14      20    XLE=(RLE-566.0)/0.505
     15            DQ=0
     16            DO 1 I=1,7
     17      1     DQ=(DQ+C(8-I))*XLE
     18            DQ=(DQ+CO)*505.0
     19      30    IF(DQ.GT.DQMAX(MON))DQ=DQMAX(MON)
     20            IF(DQ.LT.0.0)DQ=0.0
     21            RETURN
     22            END

@END
@END IGNORED - IN CONTROL MODE

@FIN
```

RUNID:XLERIE ACCT:AN9320 PROJ:HSTG4 MAX SUPS 00:10:00

SEND OUTPUT TO DENT-H15F3

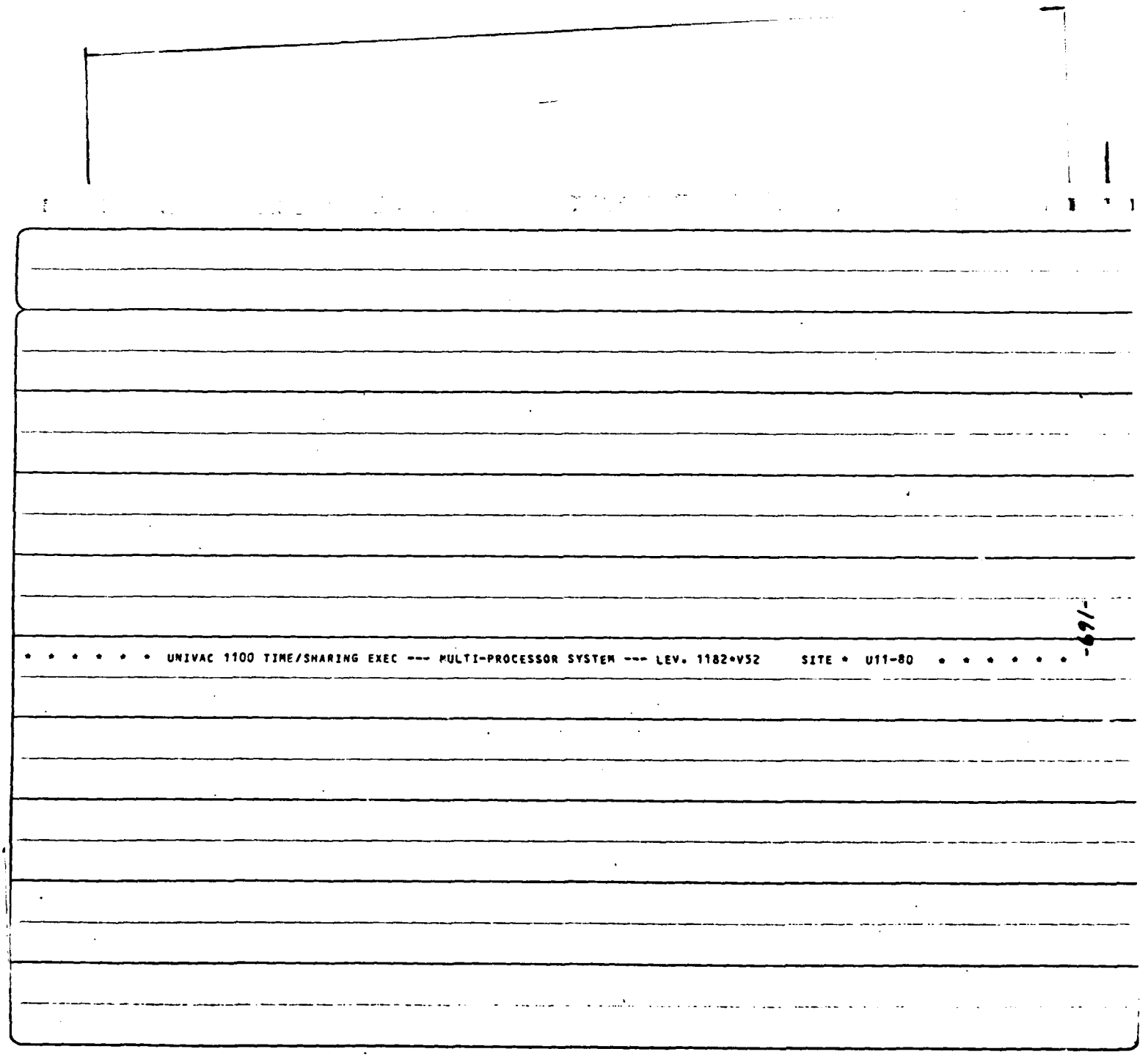
XLERIE FIN

PRIORITY: P TAPEMOUNTS: 0 MAX SERVOS: 0 ACTUAL SUPS 00:00:44

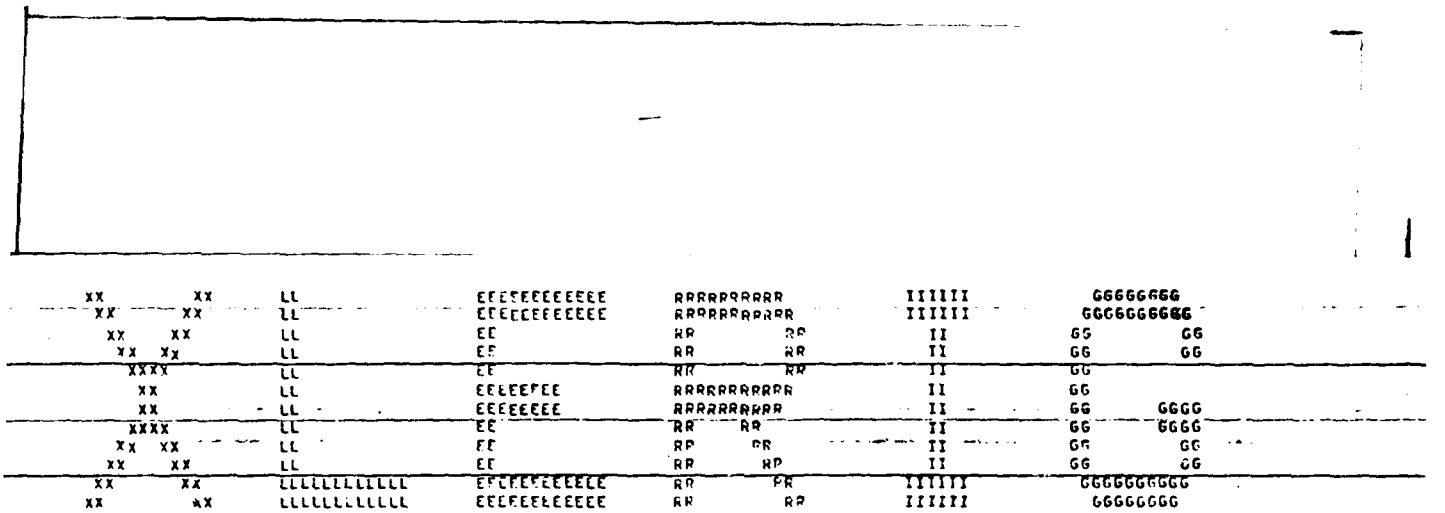
MAX CORE: 22016 MAX TRACKS: 15 CPU TIME 00:00:00

IMAGES IN: 52 CARDS OUT: 0 PAGES OUT: 50

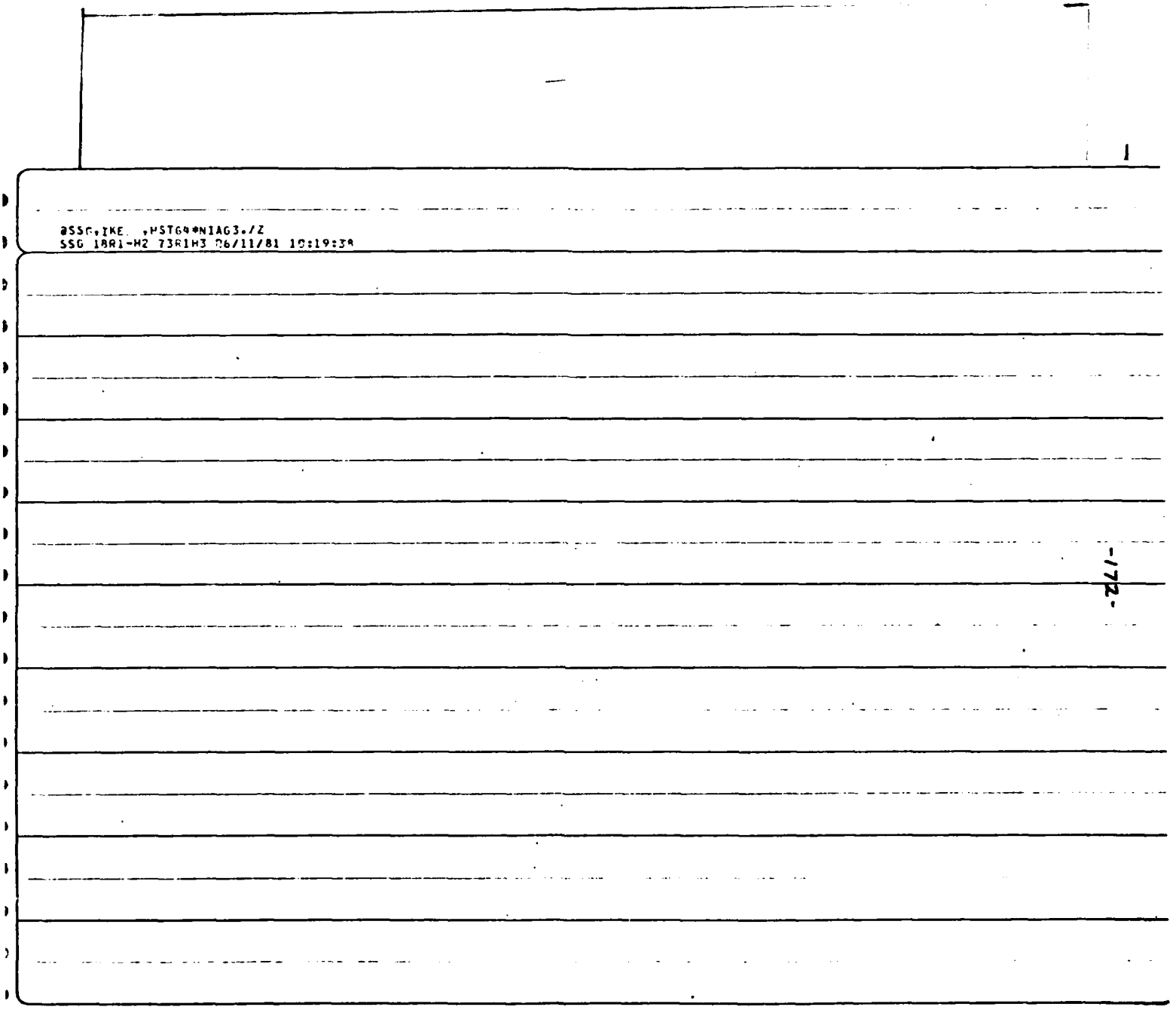
LAPSED MINS: 0 ARR 10:17 TERM 10:17:54 11JUN81 COST $ .68



* * * * * * UNIVAC 1100 TIME/SHARING EXEC --- MULTI-PROCESSOR SYSTEM --- LEV. 1182*V52 SITE * U11-80 * * * * * *


XX XX LL EEEEEEEEEEEE RRRRRRRRR IIIIII GGGGGGGG
XX XX LL EEEEEEEEEEEE RRRRRRRRRR IIIIII GGGGGGGGGG
XX XX LL EE RR RR II GG GG
XX XX LL EE RR RR II GG
XXXX LL EE RR RR II GG
XX LL EEEEEEEE RRRRRRRRR II GG GGGG
XX LL EEEEEEEE RRRRRRRRR II GG GGGG
XXXX LL EE RR RR II GG GGGG
XX XX LL EE RR RR II GG GG
XX XX LL EE RR RR II GG GG
XX XX LLLLLLLLLLLL EEEEEEEEEEEE RR RR IIIIII GGGGGGGGGG
XX XX LLLLLLLLLLLL EEEEEEEEEEEE RR RR IIIIII GGGGGGGG
DDD EEEEEEEE NN NN TTTTTTTT KK KK GGGGGG
DDDD EEEEEEEE NNN NN TTTTTTTT KK KK GGGGGGGG
DD EE NNNN NN TT KK KK GG
DD EE NN NN NN TT KK KK GG
DD EE NN NN NN TT KKKK GG
DD EEEEE NN NNNN TT KKK GG
DD EEEEE NN NNN TT KKK GG
DD EE NN NN TT KKKK GG
DD EE NN NN TT KK KK GG GG
DD EE NN NN TT KK KK GG GG
DDDD EEEEEEEE NN NN TT KK KK GGGGGGGG
DDD EEEEEEEE NN NN TT KK KK GGGGGG
K G
* * * * UNIVAC 1100 TIME/SHARING EXEC --- MULTI-PROCESSOR SYSTEM --- LEV. 1102*V52 SITE * U11-80 * * * * * *
HH 1 5555555 FFFFFFFF 3333333
HH 11 5555555 FFFFFFFF 3333333
HH 111 55 FF 33
HH 11 55 FF 33
HH 11 55 FF 33
HHHHHH 11 55555 FFFFF 33
HHHHHH 11 55 FFFFF 33
HH 11 55 FF 33
HH 11 55 FF 33
HH 11 55 55 FF 33
HH 11 55555 FF 33 33
HH 1111 555 FF 3333333
3
RUNID * XLERIG USER ID * GWTP PART NUMBER * 00 INPUT DEVICE * OUTPUT DEVICE * PRS
FILE NAME * PR0000XLERIG CREATED AT: 10:19:35 JUN 11,1981 PRINTED AT: 10:20:00 JUN 11,1981

```
@RUN,P    XLERIE,AN9320/GWTP,HSTG4,10,500
@LOG SEND OUTPUT TO DENT-H15F3
@ASG,A NIA63.
```


@SSG,IKE ,MST69*N1AG3./Z
SSG 18R1-H2 73R1H3 06/11/81 10:19:39

SS6 STREAM GENERATION STATEMENTS

Z	SUBOURPLT	5
Z	RELMAPLOAD	1, 1
Z	SUBPGS	5
Z	SUBOUR	5
Z	SUBMONTH	5
Z	SUBBHW	5
Z	SUBMONTH	1, 1
Z	SUBOUR	1, 1
Z	SUBPOND	5
Z	SUBCAS	1, 1
Z	SUBCAS	5
Z	SUBTOTAL	5
Z	MWLZW1	5
Z	MWLZW2	5
Z	DAT1	1, 1
Z	DAT1	6
Z	DAT1	5
Z	DAT3	5
Z	DAT3	6
Z	DAT3	1, 1
Z	SUBSCHEME	5
Z	SUBPEAK	1, 1
Z	SUBPEAK	5
Z	SUBBHW	1, 1
Z	SUBPOND	1, 1
Z	SUBTOTAL	1, 1
Z	MWLZW1	1, 4
Z	MWLZW2	1, 4
Z	SUBOURPLT	1, 1
Z	SUBPGS	1, 1
Z	SUBSCHEME	1, 1
Z	MAPLOAD	5
Z	ADJUST	1, 1
Z	ADJUST	5
Z	LOAD	5
Z	SUBDEC	5
Z	LOAD	1, 1
Z	LOAD	6
Z	MAPLOAD	1, 1
Z	SUBDEC	1, 1

```
SSG   REVISED   SKELETON

0001  00    *INCREMENT A FROM 1 BY 1 TO CZ]
0002  01      *IF CZ,A,3,1] <5
0003  02        $HDG  ****** CZ,A,1,1]/CZ,A,2,1] ******
0004  02        $PRT,S  HSTG%%NIAG3.CZ,A,1,1]/CZ,A,2,1]
0005  01      *END
0006  00    *LOOP
```

```
SSG   GENERATED OUTPUT STREAM       PART 1

000001              @HDG  ****** RELMAPLOAD/              ******
000002              @PRT,S  HSTG4*NIAG3.RELMAPLOAD/
000003              @HDG  ****** SUBMONTH/              ******
000004              @PRT,S  HSTG4*NIAG3.SUBMONTH/
000005              @HDG  ****** SUBDUR/              ******
000006              @PRT,S  HSTG4*NIAG3.SUBDUR/
000007              @HDG  ****** SUBCAS/              ******
000008              @PRT,S  HSTG4*NIAG3.SUBCAS/
000009              @HDG  ****** DAT1/              ******
000010              @PRT,S  HSTG4*NIAG3.DAT1/
000011              @HDG  ****** DAT3/              ******
000012              @PRT,S  HSTG4*NIAG3.DAT3/
000013              @HDG  ****** SUBPEAK/              ******
000014              @PRT,S  HSTG4*NIAG3.SUB*EAK/
000015              @HDG  ****** SUBBHW/              ******
000016              @PRT,S  HSTG4*NIAG3.SUBBHW/
000017              @HDG  ****** SUBPOND/              ******
000018              @PRT,S  HSTG4*NIAG3.SUBPOND/
000019              @HDG  ****** SUBTOTAL/              ******
000020              @PRT,S  HSTG4*NIAG3.SUBTOTAL/
000021              @HDG  ****** MWLZW1/              ******
000022              @PRT,S  HSTG4*NIAG3.MWLZW1/
000023              @HDG  ****** MWLZJ2/              ******
000024              @PRT,S  HSTG4*NIAG3.MWLZJ2/
000025              @HDG  ****** SUBDURPLT/              ******
000026              @PRT,S  HSTG4*NIAG3.SUBDURPLT/
000027              @HDG  ****** SUBPGS/              ******
000028              @PRT,S  HSTG4*NIAG3.SUBPGS/
000029              @HDG  ****** SUBSCHEME/              ******
000030              @PRT,S  HSTG4*NIAG3.SUBSCHEME/
000031              @HDG  ****** ADJUST/              ******
000032              @PRT,S  HSTG4*NIAG3.ADJUST/
000033              @HDG  ****** LOAD/              ******
000034              @PRT,S  HSTG4*NIAG3.LOAD/
000035              @HDG  ****** MAPLOAD/              ******
000036              @PRT,S  HSTG4*NIAG3.MAPLOAD/
000037              @HDG  ****** SUBDEC/              ******
000038              @PRT,S  HSTG4*NIAG3.SUBDEC/

END SSG     TIME =  00:00:02  HIGHEST ADDRESS =  0061552  OCTAL


@HDG  ****** RELMAPLOAD/              ******


@PRT,S  HSTG4*NIAG3.RELMAPLOAD/
FURPUR 28R1.M2.6 E35 S7*T11 06/11/81 10:19:41
```

```
HSTG4*NIAG3(1).RELMAPLOAD(5)
      1       @SFOR NIAG.LOAD
      2       @
      3       @MAP,N ,NIAG.LOAD
      4       IN SYS$HYDRO*LIB.GETDAY
      5       IN NIAG.LOAD
      6       IN NIAG.SUBMONTH
      7       IN NIAG.SUBDUR
      8       IN NIAG.SUBDURPLT
      9       IN NIAG.SUBDHW
     10       IN NIAG1.SUBPEAK
     11       IN NIAG1.SUBPGS
     12       IN NIAG.SUBCAS
     13       IN NIAG.SUBDEC
     14       END

@HDG  ****** SUBMONTH/              ******

@PRT,S  HSTG4*NIAG3.SUBMONTH/
FURPUR 28R1.H2.6 E35 S79T11 06/11/81 10:19:42
```

```
HSTG4*NIAG3(1).SUBMONTH(6)
      SUBROUTINE MONTH(M,IY,MD,AM)
C        CALCULATION OF DAYS IN MONTH AND NAME OF MONTH
C        BASED ON INTEGER VALUE OF MONTH AND YEAR
C          M = INTEGER VALUE OF MONTH
C          IY = LAST TWO DIGITS OF THE YEAR
C          MD = CALCULATED NO. OF DAYS IN THE MONTH
C          AM = ALPHANUMERIC MONTH LABEL
      DIMENSION AM(2),AMON(12,2)
      DATA ((AMON(I,J),J=1,2),I=1,12)/'JANUAR','Y','FEBRUA','RY',
     1'MARCH','  ','APRIL','  ','MAY','  ','JUNE','  ','JULY',
     1'  ','AUGUST','  ','SEPTEM','BER','OCTOBE','R','NOVEMB',
     1'ER','DECEMB','ER'/
      IF((M.GT.12).OR.(M.LT.1))GO TO 50
      GO TO (31,28,31,30,31,30,31,31,30,31,30,31),M
   30 MD=30
      GO TO 32
   31 MD=31
      GO TO 32
   28 IY=1900+IY
      ITY=IY/4
      ITY=ITY*4
      MD=28
      IF(ITY.EQ.IY) MD=29
   32 CONTINUE
      DO 1 I=1,2
    1 AM(I)=AMON(M,I)
      GO TO 13
   50 WRITE(6,55)
   55 FORMAT(10X,'***ERROR- M.GT.12.OR.M.LT.1')
   13 RETURN
      END

@HDG ****** SUBDUR/ ******

@PRT,S  HSTG4*NIAG3.SUBDUR/
FORFUR 28R1.H2.6 E35 S74T11 06/11/81 10:19:43
```

```
HSTG4*NIAG3(1).SUBDUR(19)
      1             COMPILER (XM=1)
      2             SUBROUTINE DUR(A,NOV,IY1,N98,N50,VALUE,VAL50)
      3       C     DURATION ROUTINE TO SORT INPUT VALUES
      4       C          A - UNSORTED VECTOR
      5       C          S - SORTED VECTOR
      6       C          P - DURATION PERCENT
      7       C          M - ORIGINAL POSITION OF SORTED ELEMENT
      8             DIMENSION A(12CC)
      9             COMMON QBAC(100,12),QBECK(100,12),DTSDEC(100,12),
     10            1POP(100,12),PCAP(100,12),PDEC(100,12),PBK(100,12),
     11            1PTOT(100,12),PTOTA(100,12),P(1200),S(1200),MOR(1200)
     12             IF(NOV.GT.1200) GO TO 6
     13             IF(N98.EQ.1) GO TO 7
     14             IF(NOV.GE.25)GO TO 7
     15             WRITE(6,45)
     16             GO TO 7
     17        6    WRITE(6,200)
     18             GO TO 999
     19        7    L=0
     20             IDUM=0
     21             IDSD=0
     22        5    L=L+1
     23             XM=0.0
     24             IF(L.GT.NOV) GO TO 13
     25             DO 32 I=1,NOV
     26             IF(L.EQ.1) GO TO 11
     27             LM1=L-1
     28             DO 10 N=1,LM1
     29             IF(I.EQ.MOR(N)) GO TO 32
     30        10   CONTINUE
     31        11   IF(XM.LE.A(I)) GO TO 20
     32             GO TO 32
     33        20   XM=A(I)
     34             MOR(L)=I
     35        32   CONTINUE
     36             GO TO 5
     37        13   DO 12 K=1,NOV
     38             ID=0
     39             N=MOR(K)
     40             S(K)=A(N)
     41        15   P(K)=(((2.*(FLOAT(K))-1.)/(2.*(FLOAT(NOV))))*100.
     42             IF(N50.EQ.1)GO TO 65
     43             IF(P(K).EQ.50.0)GO TO 60
     44             IF(P(K).GT.50.0)GO TO 70
     45        65   IF(N98.EQ.1)GO TO 12
     46             IF(NOV.LT.25)GO TO 12
     47             IF(P(K).EQ.98.0)GO TO 80
     48             IF(P(K).GT.98.0)GO TO 40
     49             GO TO 12
     50        60   VAL50=S(K)
     51             IDSD=1
     52             GO TO 12
     53        70   IF(IDSD.EQ.1)GO TO 65
     54             IJ=K-1
     55             IDSD=1
     56             VAL50=S(K)+(((S(IJ)-S(K))/(P(K)-P(IJ)))*(P(K)-50.0))
```

```
      57              GO TO 12
      58      60      VALUE=S(K)
      59              IDUM=1
      60              GO TO 12
      61      40      IF(IDUM.EQ.1)GO TO 12
      62              J=K-1
      63              IDUM=1
      64              VALUE=S(K)+(((S(J)-S(K))/(P(K)-P(J)))*(P(K)-98.0))
      65      12      CONTINUE
      66              IF(N98.EQ.1)VALUE=0.0
      67              IF(N50.EQ.1)VAL50=0.0
      68      500     FORMAT()
      69      45      FORMAT(1H1,'SORT VECTOR TOO SMALL FOR 98% VALUE-MUST BE >25',/)
      70      200     FORMAT(1H1,' SORT VECTOR TOO LARGE - MUST BE <1200',/)
      71      999     RETURN
      72              END
```

```
@HDG ****** SUBCAS/ ******

@PRT,S  MSTG**NIAG3.SUBCAS/
FURPUR 20R1.M2.6 E35 S7@T11 06/11/81 10:19:45
```

```
HSTG**NIAG3(1).SUBCAS(S)
      1            SUBROUTINE CAS(QC,J,ENDR,ITIME,QB,QBA,QOP,QCNP)
      2      C    CALCULATION OF DISCHARGE FOR OP CNP AND BECK ADJUSTED
      3      C   USING CASCADE DISCHARGE AND BECK DISCHARGE AS INPUT
      4      C     INPUT VALUES QC,J,ITIME,QB
      5      C     OUTPUT VALUES QBA,QOP,QCNP
      6            IF(QC.EQ.0.0) GO TO 10
      7            IF(QC.GT.8300.0) GO TO 20
      8            QOP=QC
      9            QCNP=0.0
     10            QBA=QB
     11            GO TO 50
     12      20    QOP=8300.0
     13            QCNP=QC-QOP
     14            QBA=QB
     15            GO TO 50
     16      10    QOP=0.0
     17            QCNP=0.0
     18            QBA=QB
     19      50    RETURN
     20            END

$HDG ****** DATI/ ******

$PRT,S HSTG**NIAG3.DATI/
FURPUR 28R1.H2.6 E35 S79T11 06/11/81 10:19:46
```

-180-

```
HSTG4*NIAG3(1).DAT1(4)
                DIMENSION XLOS(100,12),XLOQ(100,12),IY(100)
                MON1=1
                MON3=8
                READ(5,98)IDUM
                READ(5,11)((XLOS(I,J),J=1,12),IY(I),I=1,77)
                READ(5,97)IDUM
                READ(5,10,END=99)((XLOQ(I,J),J=1,12),I=1,77)
                DO 20 J=1,12
                DO 22 I=1,77
                XLOS(I,J)=XLOS(I,J)*100
                XLOQ(I,J)=XLOQ(I,J)*100
        22      CONTINUE
        20      CONTINUE
        99      DO 25 N=1,77
                WRITE(26,45)IY(N),(XLOS(N,J),J=1,12)
                WRITE(27,57)IY(N),MON1,(XLOS(N,J),XLOQ(N,J),J=1,3),
               1XLOS(N,4),XLOQ(N,4),XLOS(N,4),XLOQ(N,4),(XLOS(N,J),
               1XLOQ(N,J),J=5,6)
                WRITE(27,57)IY(N),MON3,(XLOS(N,J),XLOQ(N,J),J=7,11),
               1XLOS(N,12),XLOQ(N,12),XLOS(N,12),XLOQ(N,12)
        25      CONTINUE
                WRITE(27,35)
        98      FORMAT(A1,/)
        10      FORMAT(12F6.2)
        11      FORMAT(12F6.2,4X,I4)
        97      FORMAT(A1)
        45      FORMAT(I4,6X,12F6.0)
        57      FORMAT(I4,J2,4X,14F6.0)
        35      FORMAT('9999')
                STOP
                END

@HDG  ****** DAT3/          ******

@PRT,S  HSTG4*NIAG3.DAT3/
FURPUR 28R1.H2.6 E35 S74T11 06/11/81 10:19:46
```

-181-

```
WSTG4*NIAG3(1).DAT3(39)
      1            DIMENSION XSC(100,12),XSS(100,12),XMHS(100,12),
      2           1XMHC(100,12),XLES(100,12),XLEQ(100,12),IY(100),XLOS(100,12),
      3           1XLOQ(100,12)
      4            MON1=1
      5            MON2=7
      6      C     READ(5,98)IDUM
      7            READ(5,98)IDUM
      8            MON3=9
      9            READ(5,11)((XSS(I,J),J=1,12),IY(I),I=1,77)
     10            READ(5,98) IDUM
     11            READ(5,10)((XSQ(I,J),J=1,12),I=1,77)
     12            READ(5,98) IDUM
     13            READ(5,10)((XMHS(I,J),J=1,12),I=1,77)
     14            READ(5,98) IDUM
     15            READ(5,10)((XMHC(I,J),J=1,12),I=1,77)
     16            READ(5,98) IDUM
     17            READ(5,10)((XLES(I,J),J=1,12),I=1,77)
     18            READ(5,98) IDUM
     19            READ(5,10)((XLEQ(I,J),J=1,12),I=1,77)
     20            READ(5,98) IDUM
     21            READ(5,10)((XLOS(I,J),J=1,12),I=1,77)
     22            READ(5,98) IDUM
     23            READ(5,10,END=99)((XLOQ(I,J),J=1,12),I=1,77)
     24      99    DO 20 J=1,12
     25            DO 22 I=1,77
     26            XSS(I,J)=XSS(I,J)*100.
     27            XSQ(I,J)=XSQ(I,J)*100.
     28            XMHS(I,J)=XMHS(I,J)*100.
     29            XMHQ(I,J)=XMHQ(I,J)*100.
     30            XLES(I,J)=XLES(I,J)*100.
     31            XLEQ(I,J)=XLEQ(I,J)*100.
     32            XLOS(I,J)=XLOS(I,J)*100.
     33            XLOQ(I,J)=XLOQ(I,J)*100.
     34      22    CONTINUE
     35      20    CONTINUE
     36            I=77
     37            DO 25 N=1,I
     38            WRITE(25,45)IY(N),(XMHS(N,J),J=1,12)
     39            WRITE(26,55)IY(N),MON1,(XLES(N,J),XLEQ(N,J),J=1,6)
     40            WRITE(26,55)IY(N),MON2,(XLES(N,J),XLEQ(N,J),J=7,12)
     41            WRITE(27,57)IY(N),MON1,(XLOS(N,J),XLOQ(N,J),J=1,3),
     42           1XLOS(N,4),XLOQ(N,4),XLOS(N,4),XLOQ(N,4),(XLOS(N,J),
     43           1XLOQ(N,J),J=5,6)
     44            WRITE(27,57)IY(N),MON3,(XLOS(N,J),XLOQ(N,J),J=7,11),
     45           1XLOS(N,12),XLOQ(N,12),XLOS(N,12),XLOQ(N,12)
     46      25    CONTINUE
     47            WRITE(26,35)
     48            DO 31 N=1,I
     49      31    WRITE(26,45)IY(N),(XLOS(N,J),J=1,12)
     50            WRITE(25,35)
     51            WRITE(27,35)
     52            DO 30 N=1,I
     53            WRITE(25,50)IY(N),MON1,(XSS(N,J),XSQ(N,J),J=1,6)
     54            WRITE(25,50)IY(N),MON2,(XSS(N,J),XSQ(N,J),J=7,12)
     55      30    CONTINUE
     56            WRITE(25,35)
```

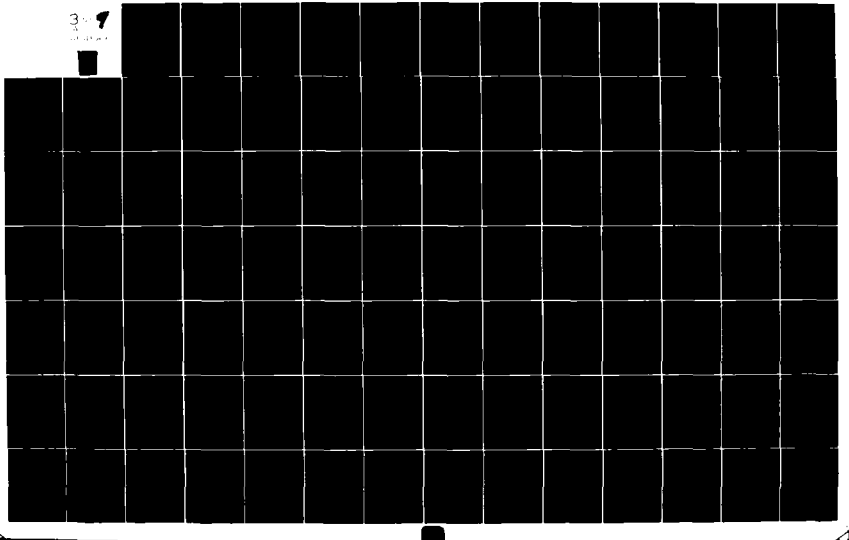
```
   10   FORMAT(12F6.2)
   35   FORMAT('9999')
   45   FORMAT(I4,6X,12F6.0)
   50   FORMAT(I4,J2,4X,12F6.0)
   55   FORMAT(I4,J2,4X,6(F6.0,F6.0))
   57   FORMAT(I4,J2,4X,14F6.0)
   98   FORMAT(A1)
   11   FORMAT(12F6.2,4X,I4)
   97   FORMAT(A1,312(/))
        STOP
        END
```

@HDG ****** SUBPEAK/ ******

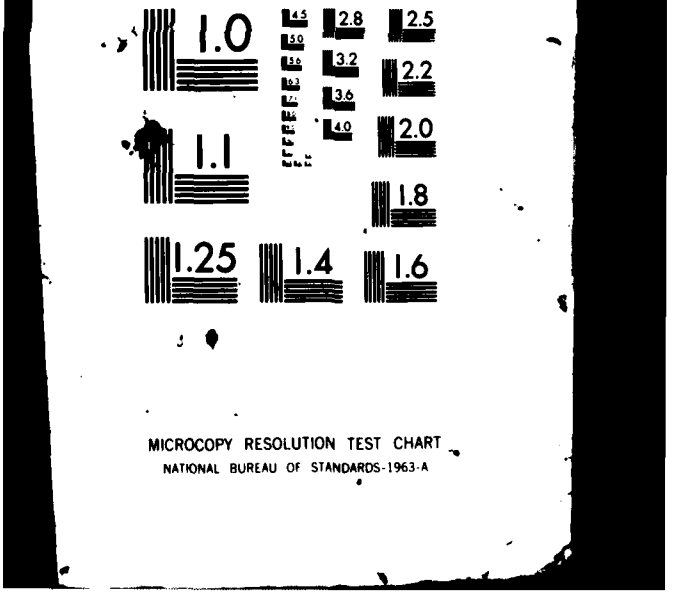
```
@PRT,S  HSTG4*NIAG3.SUBPEAK/
FUKPUR 28R1.H2.6 E35 S74T11 06/11/81 10:19:47
```

AD-A114 589 INTERNATIONAL LAKE ERIE REGULATION STUDY BOARD F/G 13/2
LAKE ERIE WATER LEVEL STUDY. APPENDIX E. POWER. ANNEX D. COMPUT--ETC(U)
JUL 81

UNCLASSIFIED NL



1458


1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
4.5
5.0
5.6
6.3
7.1
8.0
9.0
10
11
12
14
16
18
20
22
25
28
32
36
40
45
50
56
63
71
80
90
100
110
125
140
160
180
200
220
250
280
320
360
400
450
500
560
630
710
800
900
1000
1100
1250
1400
1600
1800
2000
2200
2500
2800
3200
3600
4000
4500
5000
5600
6300
7100
8000
9000
10000
11000
12500
14000
16000
18000
20000
22000
25000
28000
32000
36000
40000
45000
50000
56000
63000
71000
80000
90000
100000
110000
125000
140000
160000
180000
200000
220000
250000
280000
320000
360000
400000
450000
500000
560000
630000
710000
800000
900000
1000000
1100000
1250000
1400000
1600000
1800000
2000000
2200000
2500000
2800000
3200000
3600000
4000000
4500000
5000000
5600000
6300000
7100000
8000000
9000000
10000000
11000000
12500000
14000000
16000000
18000000
20000000
22000000
25000000
28000000
32000000
36000000
40000000
45000000
50000000
56000000
63000000
71000000
80000000
90000000
100000000
110000000
125000000
140000000
160000000
180000000
200000000
220000000
250000000
280000000
320000000
360000000
400000000
450000000
500000000
560000000
630000000
710000000
800000000
900000000
1000000000
1100000000
1250000000
1400000000
1600000000
1800000000
2000000000
2200000000
2500000000
2800000000
3200000000
3600000000
4000000000
4500000000
5000000000
5600000000
6300000000
7100000000
8000000000
9000000000
10000000000
11000000000
12500000000
14000000000
16000000000
18000000000
20000000000
22000000000
25000000000
28000000000
32000000000
36000000000
40000000000
45000000000
50000000000
56000000000
63000000000
71000000000
80000000000
90000000000
100000000000
110000000000
125000000000
140000000000
160000000000
180000000000
200000000000
220000000000
250000000000
280000000000
320000000000
360000000000
400000000000
450000000000
500000000000
560000000000
630000000000
710000000000
800000000000
900000000000
1000000000000
1100000000000
1250000000000
1400000000000
1600000000000
1800000000000
2000000000000
2200000000000
2500000000000
2800000000000
3200000000000
3600000000000
4000000000000
4500000000000
5000000000000
5600000000000
6300000000000
7100000000000
8000000000000
9000000000000
10000000000000
11000000000000
12500000000000
14000000000000
16000000000000
18000000000000
20000000000000
22000000000000
25000000000000
28000000000000
32000000000000
36000000000000
40000000000000
45000000000000
50000000000000
56000000000000
63000000000000
71000000000000
80000000000000
90000000000000
100000000000000
110000000000000
125000000000000
140000000000000
160000000000000
180000000000000
200000000000000
220000000000000
250000000000000
280000000000000
320000000000000
360000000000000
400000000000000
450000000000000
500000000000000
560000000000000
630000000000000
710000000000000
800000000000000
900000000000000
1000000000000000
1100000000000000
1250000000000000
1400000000000000
1600000000000000
1800000000000000
2000000000000000
2200000000000000
2500000000000000
2800000000000000
3200000000000000
3600000000000000
4000000000000000
4500000000000000
5000000000000000
5600000000000000
6300000000000000
7100000000000000
8000000000000000
9000000000000000
10000000000000000
11000000000000000
12500000000000000
14000000000000000
16000000000000000
18000000000000000
20000000000000000
22000000000000000
25000000000000000
28000000000000000
32000000000000000
36000000000000000
40000000000000000
45000000000000000
50000000000000000
56000000000000000
63000000000000000
71000000000000000
80000000000000000
90000000000000000
100000000000000000
110000000000000000
125000000000000000
140000000000000000
160000000000000000
180000000000000000
200000000000000000
220000000000000000
250000000000000000
280000000000000000
320000000000000000
360000000000000000
400000000000000000
450000000000000000
500000000000000000
560000000000000000
630000000000000000
710000000000000000
800000000000000000
900000000000000000
1000000000000000000
1100000000000000000
1250000000000000000
1400000000000000000
1600000000000000000
1800000000000000000
2000000000000000000
2200000000000000000
2500000000000000000
2800000000000000000
3200000000000000000
3600000000000000000
4000000000000000000
4500000000000000000
5000000000000000000
5600000000000000000
6300000000000000000
7100000000000000000
8000000000000000000
9000000000000000000
10000000000000000000
11000000000000000000
12500000000000000000
14000000000000000000
16000000000000000000
18000000000000000000
20000000000000000000
22000000000000000000
25000000000000000000
28000000000000000000
32000000000000000000
36000000000000000000
40000000000000000000
45000000000000000000
50000000000000000000
56000000000000000000
63000000000000000000
71000000000000000000
80000000000000000000
90000000000000000000
100000000000000000000
110000000000000000000
125000000000000000000
140000000000000000000
160000000000000000000
180000000000000000000
200000000000000000000
220000000000000000000
250000000000000000000
280000000000000000000
320000000000000000000
360000000000000000000
400000000000000000000
450000000000000000000
500000000000000000000
560000000000000000000
630000000000000000000
710000000000000000000
800000000000000000000
900000000000000000000
1000000000000000000000
1100000000000000000000
1250000000000000000000
1400000000000000000000
1600000000000000000000
1800000000000000000000
2000000000000000000000
2200000000000000000000
2500000000000000000000
2800000000000000000000
3200000000000000000000
3600000000000000000000
4000000000000000000000
4500000000000000000000
5000000000000000000000
5600000000000000000000
6300000000000000000000
7100000000000000000000
8000000000000000000000
9000000000000000000000
10000000000000000000000
11000000000000000000000
12500000000000000000000
14000000000000000000000
16000000000000000000000
18000000000000000000000
20000000000000000000000
22000000000000000000000
25000000000000000000000
28000000000000000000000
32000000000000000000000
36000000000000000000000
40000000000000000000000
45000000000000000000000
50000000000000000000000
56000000000000000000000
63000000000000000000000
71000000000000000000000
80000000000000000000000
90000000000000000000000
100000000000000000000000
110000000000000000000000
125000000000000000000000
140000000000000000000000
160000000000000000000000
180000000000000000000000
200000000000000000000000
220000000000000000000000
250000000000000000000000
280000000000000000000000
320000000000000000000000
360000000000000000000000
400000000000000000000000
450000000000000000000000
500000000000000000000000
560000000000000000000000
630000000000000000000000
710000000000000000000000
800000000000000000000000
900000000000000000000000
1000000000000000000000000
1100000000000000000000000
1250000000000000000000000
1400000000000000000000000
1600000000000000000000000
1800000000000000000000000
2000000000000000000000000
2200000000000000000000000
2500000000000000000000000
2800000000000000000000000
3200000000000000000000000
3600000000000000000000000
4000000000000000000000000
4500000000000000000000000
5000000000000000000000000
5600000000000000000000000
6300000000000000000000000
7100000000000000000000000
8000000000000000000000000
9000000000000000000000000
10000000000000000000000000
11000000000000000000000000
12500000000000000000000000
14000000000000000000000000
16000000000000000000000000
18000000000000000000000000
20000000000000000000000000
22000000000000000000000000
25000000000000000000000000
28000000000000000000000000
32000000000000000000000000
36000000000000000000000000
40000000000000000000000000
45000000000000000000000000
50000000000000000000000000
56000000000000000000000000
63000000000000000000000000
71000000000000000000000000
80000000000000000000000000
90000000000000000000000000
100000000000000000000000000
110000000000000000000000000
125000000000000000000000000
140000000000000000000000000
160000000000000000000000000
180000000000000000000000000
200000000000000000000000000
220000000000000000000000000
250000000000000000000000000
280000000000000000000000000
320000000000000000000000000
360000000000000000000000000
400000000000000000000000000
450000000000000000000000000
500000000000000000000000000
560000000000000000000000000
630000000000000000000000000
710000000000000000000000000
800000000000000000000000000
900000000000000000000000000
1000000000000000000000000000
1100000000000000000000000000
1250000000000000000000000000
1400000000000000000000000000
1600000000000000000000000000
1800000000000000000000000000
2000000000000000000000000000
2200000000000000000000000000
2500000000000000000000000000
2800000000000000000000000000
3200000000000000000000000000
3600000000000000000000000000
4000000000000000000000000000
4500000000000000000000000000
5000000000000000000000000000
5600000000000000000000000000
6300000000000000000000000000
7100000000000000000000000000
8000000000000000000000000000
9000000000000000000000000000
10000000000000000000000000000
11000000000000000000000000000
12500000000000000000000000000
14000000000000000000000000000
16000000000000000000000000000
18000000000000000000000000000
20000000000000000000000000000
22000000000000000000000000000
25000000000000000000000000000
28000000000000000000000000000
32000000000000000000000000000
36000000000000000000000000000
40000000000000000000000000000
45000000000000000000000000000
50000000000000000000000000000
56000000000000000000000000000
63000000000000000000000000000
71000000000000000000000000000
80000000000000000000000000000
90000000000000000000000000000
100000000000000000000000000000
110000000000000000000000000000
125000000000000000000000000000
140000000000000000000000000000
160000000000000000000000000000
180000000000000000000000000000
200000000000000000000000000000
220000000000000000000000000000
250000000000000000000000000000
280000000000000000000000000000
320000000000000000000000000000
360000000000000000000000000000
400000000000000000000000000000
450000000000000000000000000000
500000000000000000000000000000
560000000000000000000000000000
630000000000000000000000000000
710000000000000000000000000000
800000000000000000000000000000
900000000000000000000000000000
1000000000000000000000000000000
1100000000000000000000000000000
1250000000000000000000000000000
1400000000000000000000000000000
1600000000000000000000000000000
1800000000000000000000000000000
2000000000000000000000000000000
2200000000000000000000000000000
2500000000000000000000000000000
2800000000000000000000000000000
3200000000000000000000000000000
3600000000000000000000000000000
4000000000000000000000000000000
4500000000000000000000000000000
5000000000000000000000000000000
5600000000000000000000000000000
6300000000000000000000000000000
7100000000000000000000000000000
8000000000000000000000000000000
9000000000000000000000000000000
10000000000000000000000000000000
11000000000000000000000000000000
12500000000000000000000000000000
14000000000000000000000000000000
16000000000000000000000000000000
18000000000000000000000000000000
20000000000000000000000000000000
22000000000000000000000000000000
25000000000000000000000000000000
28000000000000000000000000000000
32000000000000000000000000000000
36000000000000000000000000000000
40000000000000000000000000000000
45000000000000000000000000000000
50000000000000000000000000000000
56000000000000000000000000000000
63000000000000000000000000000000
71000000000000000000000000000000
80000000000000000000000000000000
90000000000000000000000000000000
100000000000000000000000000000000
110000000000000000000000000000000
125000000000000000000000000000000
140000000000000000000000000000000
160000000000000000000000000000000
180000000000000000000000000000000
200000000000000000000000000000000
220000000000000000000000000000000
250000000000000000000000000000000
280000000000000000000000000000000
320000000000000000000000000000000
360000000000000000000000000000000
400000000000000000000000000000000
450000000000000000000000000000000
500000000000000000000000000000000
560000000000000000000000000000000
630000000000000000000000000000000
710000000000000000000000000000000
800000000000000000000000000000000
900000000000000000000000000000000
1000000000000000000000000000000000
1100000000000000000000000000000000
1250000000000000000000000000000000
1400000000000000000000000000000000
1600000000000000000000000000000000
1800000000000000000000000000000000
2000000000000000000000000000000000
2200000000000000000000000000000000
2500000000000000000000000000000000
2800000000000000000000000000000000
3200000000000000000000000000000000
3600000000000000000000000000000000
4000000000000000000000000000000000
4500000000000000000000000000000000
5000000000000000000000000000000000
5600000000000000000000000000000000
6300000000000000000000000000000000
7100000000000000000000000000000000
8000000000000000000000000000000000
9000000000000000000000000000000000
10000000000000000000000000000000000
11000000000000000000000000000000000
12500000000000000000000000000000000
14000000000000000000000000000000000
16000000000000000000000000000000000
18000000000000000000000000000000000
20000000000000000000000000000000000
22000000000000000000000000000000000
25000000000000000000000000000000000
28000000000000000000000000000000000
32000000000000000000000000000000000
36000000000000000000000000000000000
40000000000000000000000000000000000
45000000000000000000000000000000000
50000000000000000000000000000000000
56000000000000000000000000000000000
63000000000000000000000000000000000
71000000000000000000000000000000000
80000000000000000000000000000000000
90000000000000000000000000000000000
100000000000000000000000000000000000
110000000000000000000000000000000000
125000000000000000000000000000000000
140000000000000000000000000000000000
160000000000000000000000000000000000
180000000000000000000000000000000000
200000000000000000000000000000000000
220000000000000000000000000000000000
250000000000000000000000000000000000
280000000000000000000000000000000000
320000000000000000000000000000000000
360000000000000000000000000000000000
400000000000000000000000000000000000
450000000000000000000000000000000000
500000000000000000000000000000000000
560000000000000000000000000000000000
630000000000000000000000000000000000
710000000000000000000000000000000000
800000000000000000000000000000000000
900000000000000000000000000000000000
1000000000000000000000000000000000000
1100000000000000000000000000000000000
1250000000000000000000000000000000000
1400000000000000000000000000000000000
1600000000000000000000000000000000000
1800000000000000000000000000000000000
2000000000000000000000000000000000000
2200000000000000000000000000000000000
2500000000000000000000000000000000000
2800000000000000000000000000000000000
3200000000000000000000000000000000000
3600000000000000000000000000000000000
4000000000000000000000000000000000000
4500000000000000000000000000000000000
5000000000000000000000000000000000000
5600000000000000000000000000000000000
6300000000000000000000000000000000000
7100000000000000000000000000000000000
8000000000000000000000000000000000000
9000000000000000000000000000000000000
10000000000000000000000000000000000000
11000000000000000000000000000000000000
12500000000000000000000000000000000000
14000000000000000000000000000000000000
16000000000000000000000000000000000000
18000000000000000000000000000000000000
20000000000000000000000000000000000000
22000000000000000000000000000000000000
25000000000000000000000000000000000000
28000000000000000000000000000000000000
32000000000000000000000000000000000000
36000000000000000000000000000000000000
40000000000000000000000000000000000000
45000000000000000000000000000000000000
50000000000000000000000000000000000000
56000000000000000000000000000000000000
63000000000000000000000000000000000000
71000000000000000000000000000000000000
80000000000000000000000000000000000000
90000000000000000000000000000000000000
100000000000000000000000000000000000000
110000000000000000000000000000000000000
125000000000000000000000000000000000000
140000000000000000000000000000000000000
160000000000000000000000000000000000000
180000000000000000000000000000000000000
200000000000000000000000000000000000000
220000000000000000000000000000000000000
250000000000000000000000000000000000000
280000000000000000000000000000000000000
320000000000000000000000000000000000000
360000000000000000000000000000000000000
400000000000000000000000000000000000000
450000000000000000000000000000000000000
500000000000000000000000000000000000000
560000000000000000000000000000000000000
630000000000000000000000000000000000000
710000000000000000000000000000000000000
800000000000000000000000000000000000000
900000000000000000000000000000000000000
1000000000000000000000000000000000000000
1100000000000000000000000000000000000000
1250000000000000000000000000000000000000
1400000000000000000000000000000000000000
1600000000000000000000000000000000000000
1800000000000000000000000000000000000000
2000000000000000000000000000000000000000
2200000000000000000000000000000000000000
2500000000000000000000000000000000000000
2800000000000000000000000000000000000000
3200000000000000000000000000000000000000
3600000000000000000000000000000000000000
4000000000000000000000000000000000000000
4500000000000000000000000000000000000000
5000000000000000000000000000000000000000
5600000000000000000000000000000000000000
6300000000000000000000000000000000000000
7100000000000000000000000000000000000000
8000000000000000000000000000000000000000
9000000000000000000000000000000000000000
10000000000000000000000000000000000000000
11000000000000000000000000000000000000000
12500000000000000000000000000000000000000
14000000000000000000000000000000000000000
16000000000000000000000000000000000000000
18000000000000000000000000000000000000000
20000000000000000000000000000000000000000
22000000000000000000000000000000000000000
25000000000000000000000000000000000000000
28000000000000000000000000000000000000000
32000000000000000000000000000000000000000
36000000000000000000000000000000000000000
40000000000000000000000000000000000000000
45000000000000000000000000000000000000000
50000000000000000000000000000000000000000
56000000000000000000000000000000000000000
63000000000000000000000000000000000000000
71000000000000000000000000000000000000000
80000000000000000000000000000000000000000
90000000000000000000000000000000000000000
100000000000000000000000000000000000000000
110000000000000000000000000000000000000000
125000000000000000000000000000000000000000
140000000000000000000000000000000000000000
160000000000000000000000000000000000000000
180000000000000000000000000000000000000000
200000000000000000000000000000000000000000
220000000000000000000000000000000000000000
250000000000000000000000000000000000000000
280000000000000000000000000000000000000000
320000000000000000000000000000000000000000
360000000000000000000000000000000000000000
400000000000000000000000000000000000000000
450000000000000000000000000000000000000000
500000000000000000000000000000000000000000
560000000000000000000000000000000000000000
630000000000000000000000000000000000000000
710000000000000000000000000000000000000000
800000000000000000000000000000000000000000
900000000000000000000000000000000000000000
1000000000000000000000000000000000000000000
1100000000000000000000000000000000000000000
1250000000000000000000000000000000000000000
1400000000000000000000000000000000000000000
1600000000000000000000000000000000000000000
1800000000000000000000000000000000000000000
2000000000000000000000000000000000000000000
2200000000000000000000000000000000000000000
2500000000000000000000000000000000000000000
2800000000000000000000000000000000000000000
3200000000000000000000000000000000000000000
3600000000000000000000000000000000000000000
4000000000000000000000000000000000000000000
4500000000000000000000000000000000000000000
5000000000000000000000000000000000000000000
5600000000000000000000000000000000000000000
6300000000000000000000000000000000000000000
7100000000000000000000000000000000000000000
8000000000000000000000000000000000000000000
9000000000000000000000000000000000000000000
10000000000000000000000000000000000000000000
11000000000000000000000000000000000000000000
12500000000000000000000000000000000000000000
14000000000000000000000000000000000000000000
16000000000000000000000000000000000000000000
18000000000000000000000000000000000000000000
20000000000000000000000000000000000000000000
22000000000000000000000000000000000000000000
25000000000000000000000000000000000000000000
28000000000000000000000000000000000000000000
32000000000000000000000000000000000000000000
36000000000000000000000000000000000000000000
40000000000000000000000000000000000000000000
45000000000000000000000000000000000000000000
50000000000000000000000000000000000000000000
56000000000000000000000000000000000000000000
63000000000000000000000000000000000000000000
71000000000000000000000000000000000000000000
80000000000000000000000000000000000000000000
90000000000000000000000000000000000000000000
100000000000000000000000000000000000000000000
110000000000000000000000000000000000000000000
125000000000000000000000000000000000000000000
140000000000000000000000000000000000000000000
160000000000000000000000000000000000000000000
180000000000000000000000000000000000000000000
200000000000000000000000000000000000000000000
220000000000000000000000000000000000000000000
250000000000000000000000000000000000000000000
280000000000000000000000000000000000000000000
320000000000000000000000000000000000000000000
360000000000000000000000000000000000000000000
400000000000000000000000000000000000000000000
450000000000000000000000000000000000000000000
500000000000000000000000000000000000000000000
560000000000000000000000000000000000000000000
630000000000000000000000000000000000000000000
710000000000000000000000000000000000000000000
800000000000000000000000000000000000000000000
900000000000000000000000000000000000000000000
1000000000000000000000000000000000000000000000
1100000000000000000000000000000000000000000000
1250000000000000000000000000000000000000000000
1400000000000000000000000000000000000000000000
1600000000000000000000000000000000000000000000
1800000000000000000000000000000000000000000000
2000000000000000000000000000000000000000000000
2200000000000000000000000000000000000000000000
2500000000000000000000000000000000000000000000
2800000000000000000000000000000000000000000000
3200000000000000000000000000000000000000000000
3600000000000000000000000000000000000000000000
4000000000000000000000000000000000000000000000
4500000000000000000000000000000000000000000000
5000000000000000000000000000000000000000000000
5600000000000000000000000000000000000000000000
6300000000000000000000000000000000000000000000
7100000000000000000000000000000000000000000000
8000000000000000000000000000000000000000000000
9000000000000000000000000000000000000000000000
10000000000000000000000000000000000000000000000
11000000000000000000000000000000000000000000000
12500000000000000000000000000000000000000000000
14000000000000000000000000000000000000000000000
16000000000000000000000000000000000000000000000
18000000000000000000000000000000000000000000000
20000000000000000000000000000000000000000000000
22000000000000000000000000000000000000000000000
25000000000000000000000000000000000000000000000
28000000000000000000000000000000000000000000000
32000000000000000000000000000000000000000000000
36000000000000000000000000000000000000000000000
40000000000000000000000000000000000000000000000
45000000000000000000000000000000000000000000000
50000000000000000000000000000000000000000000000
56000000000000000000000000000000000000000000000
63000000000000000000000000000000000000000000000
71000000000000000000000000000000000000000000000
80000000000000000000000000000000000000000000000
90000000000000000000000000000000000000000000000
100000000000000000000000000000000000000000000000
110000000000000000000000000000000000000000000000
125000000000000000000000000000000000000000000000
140000000000000000000000000000000000000000000000
160000000000000000000000000000000000000000000000
180000000000000000000000000000000000000000000000
200000000000000000000000000000000000000000000000
220000000000000000000000000000000000000000000000
250000000000000000000000000000000000000000000000
280000000000000000000000000000000000000000000000
320000000000000000000000000000000000000000000000
360000000000000000000000000000000000000000000000
400000000000000000000000000000000000000000000000
450000000000000000000000000000000000000000000000
500000000000000000000000000000000000000000000000
560000000000000000000000000000000000000000000000
630000000000000000000000000000000000000000000000
710000000000000000000000000000000000000000000000
800000000000000000000000000000000000000000000000
900000000000000000000000000000000000000000000000
1000000000000000000000000000000000000000000000000
1100000000000000000000000000000000000000000000000
1250000000000000000000000000000000000000000000000
1400000000000000000000000000000000000000000000000
1600000000000000000000000000000000000000000000000
1800000000000000000000000000000000000000000000000
2000000000000000000000000000000000000000000000000
2200000000000000000000000000000000000000000000000
2500000000000000000000000000000000000000000000000
2800000000000000000000000000000000000000000000000
3200000000000000000000000000000000000000000000000
3600000000000000000000000000000000000000000000000
4000000000000000000000000000000000000000000000000
4500000000000000000000000000000000000000000000000
5000000000000000000000000000000000000000000000000
5600000000000000000000000000000000000000000000000
6300000000000000000000000000000000000000000000000
7100000000000000000000000000000000000000000000000
8000000000000000000000000000000000000000000000000
9000000000000000000000000000000000000000000000000
10000000000000000000000000000000000000000000000000
11000000000000000000000000000000000000000000000000
12500000000000000000000000000000000000000000000000
14000000000000000000000000000000000000000000000000
16000000000000000000000000000000000000000000000000
18000000000000000000000000000000000000000000000000
20000000000000000000000000000000000000000000000000
22000000000000000000000000000000000000000000000000
25000000000000000000000000000000000000000000000000
28000000000000000000000000000000000000000000000000
32000000000000000000000000000000000000000000000000
36000000000000000000000000000000000000000000000000
40000000000000000000000000000000000000000000000000
45000000000000000000000000000000000000000000000000
50000000000000000000000000000000000000000000000000
56000000000000000000000000000000000000000000000000
63000000000000000000000000000000000000000000000000
71000000000000000000000000000000000000000000000000
80000000000000000000000000000000000000000000000000
90000000000000000000000000000000000000000000000000
100000000000000000000000000000000000000000000000000
110000000000000000000000000000000000000000000000000
125000000000000000000000000000000000000000000000000
140000000000000000000000000000000000000000000000000
160000000000000000000000000000000000000000000000000
180000000000000000000000000000000000000000000000000
200000000000000000000000000000000000000000000000000
220000000000000000000000000000000000000000000000000
250000000000000000000000000000000000000000000000000
280000000000000000000000000000000000000000000000000
320000000000000000000000000000000000000000000000000
360000000000000000000000000000000000000000000000000
400000000000000000000000000000000000000000000000000
450000000000000000000000000000000000000000000000000
500000000000000000000000000000000000000000000000000
560000000000000000000000000000000000000000000000000
630000000000000000000000000000000000000000000000000
710000000000000000000000000000000000000000000000000
800000000000000000000000000000000000000000000000000
900000000000000000000000000000000000000000000000000
1000000000000000000000000000000000000000000000000000
1100000000000000000000000000000000000000000000000000
1250000000000000000000000000000000000000000000000000
1400000000000000000000000000000000000000000000000000
1600000000000000000000000000000000000000000000000000
1800000000000000000000000000000000000000000000000000
2000000000000000000000000000000000000000000000000000
2200000000000000000000000000000000000000000000000000
2500000000000000000000000000000000000000000000000000
2800000000000000000000000000000000000000000000000000
3200000000000000000000000000000000000000000000000000
3600000000000000000000000000000000000000000000000000
4000000000000000000000000000000000000000000000000000
4500000000000000000000000000000000000000000000000000
5000000000000000000000000000000000000000000000000000
5600000000000000000000000000000000000000000000000000
6300000000000000000000000000000000000000000000000000
7100000000000000000000000000000000000000000000000000
8000000000000000000000000000000000000000000000000000
9000000000000000000000000000000000000000000000000000
10000000000000000000000000000000000000000000000000000
11000000000000000000000000000000000000000000000000000
12500000000000000000000000000000000000000000000000000
14000000000000000000000000000000000000000000000000000
16000000000000000000000000000000000000000000000000000
18000000000000000000000000000000000000000000000000000
20000000000000000000000000000000000000000000000000000
22000000000000000000000000000000000000000000000000000
25000000000000000000000000000000000000000000000000000
28000000000000000000000000000000000000000000000000000
32000000000000000000000000000000000000000000000000000
36000000000000000000000000000000000000000000000000000
40000000000000000000000000000000000000000000000000000
45000000000000000000000000000000000000000000000000000
50000000000000000000000000000000000000000000000000000
56000000000000000000000000000000000000000000000000000
63000000000000000000000000000000000000000000000000000
71000000000000000000000000000000000000000000000000000
80000000000000000000000000000000000000000000000000000
90000000000000000000000000000000000000000000000000000
100000000000000000000000000000000000000000000000000000
110000000000000000000000000000000000000000000000000000
125000000000000000000000000000000000000000000000000000
140000000000000000000000000000000000000000000000000000
160000000000000000000000000000000000000000000000000000
180000000000000000000000000000000000000000000000000000
200000000000000000000000000000000000000000000000000000
220000000000000000000000000000000000000000000000000000
250000000000000000000000000000000000000000000000000000
280000000000000000000000000000000000000000000000000000
320000000000000000000000000000000000000000000000000000
360000000000000000000000000000000000000000000000000000
400000000000000000000000000000000000000000000000000000
450000000000000000000000000000000000000000000000000000
500000000000000000000000000000000000000000000000000000
560000000000000000000000000000000000000000000000000000
630000000000000000000000000000000000000000000000000000
710000000000000000000000000000000000000000000000000000
800000000000000000000000000000000000000000000000000000
900000000000000000000000000000000000000000000000000000
1000000000000000000000000000000000000000000000000000000
1100000000000000000000000000000000000000000000000000000
1250000000000000000000000000000000000000000000000000000
1400000000000000000000000000000000000000000000000000000
1600000000000000000000000000000000000000000000000000000
1800000000000000000000000000000000000000000000000000000
2000000000000000000000000000000000000000000000000000000
2200000000000000000000000000000000000000000000000000000
2500000000000000000000000000000000000000000000000000000
2800000000000000000000000000000000000000000000000000000
3200000000000000000000000000000000000000000000000000000
3600000000000000000000000000000000000000000000000000000
4000000000000000000000000000000000000000000000000000000
4500000000000000000000000000000000000000000000000000000
5000000000000000000000000000000000000000000000000000000
5600000000000000000000000000000000000000000000000000000
6300000000000000000000000000000000000000000000000000000
7100000000000000000000000000000000000000000000000000000
8000000000000000000000000000000000000000000000000000000
9000000000000000000000000000000000000000000000000000000
10000000000000000000000000000000000000000000000000000000
11000000000000000000000000000000000000000000000000000000
12500000000000000000000000000000000000000000000000000000
14000000000000000000000000000000000000000000000000000000
16000000000000000000000000000000000000000000000000000000
18000000000000000000000000000000000000000000000000000000
20000000000000000000000000000000000000000000000000000000
22000000000000000000000000000000000000000000000000000000
25000000000000000000000000000000000000000000000000000000
28000000000000000000000000000000000000000000000000000000
32000000000000000000000000000000000000000000000000000000
36000000000000000000000000000000000000000000000000000000
40000000000000000000000000000000000000000000000000000000
45000000000000000000000000000000000000000000000000000000
50000000000000000000000000000000000000000000000000000000
56000000000000000000000000000000000000000000000000000000
63000000000000000000000000000000000000000000000000000000
71000000000000000000000000000000000000000000000000000000
80000000000000000000000000000000000000000000000000000000
90000000000000000000000000000000000000000000000000000000
100000000000000000000000000000000000000000000000000000000
110000000000000000000000000000000000000000000000000000000
125000000000000000000000000000000000000000000000000000000
140000000000000000000000000000000000000000000000000000000
160000000000000000000000000000000000000000000000000000000
180000000000000000000000000000000000000000000000000000000
200000000000000000000000000000000000000000000000000000000
220000000000000000000000000000000000000000000000000000000
250000000000000000000000000000000000000000000000000000000
280000000000000000000000000000000000000000000000000000000
320000000000000000000000000000000000000000000000000000000
360000000000000000000000000000000000000000000000000000000
400000000000000000000000000000000000000000000000000000000
450000000000000000000000000000000000000000000000000000000
500000000000000000000000000000000000000000000000000000000
560000000000000000000000000000000000000000000000000000000
630000000000000000000000000000000000000000000000000000000
710000000000000000000000000000000000000000000000000000000
800000000000000000000000000000000000000000000000000000000
900000000000000000000000000000000000000000000000000000000
1000000000000000000000000000000000000000000000000000000000
1100000000000000000000000000000000000000000000000000000000
1250000000000000000000000000000000000000000000000000000000
1400000000000000000000000000000000000000000000000000000000
1600000000000000000000000000000000000000000000000000000000
1800000000000000000000000000000000000000000000000000000000
2000000000000000000000000000000000000000000000000000000000
2200000000000000000000000000000000000000000000000000000000
2500000000000000000000000000000000000000000000000000000000
2800000000000000000000000000000000000000000000000000000000
3200000000000000000000000000000000000000000000000000000000
3600000000000000000000000000000000000000000000000000000000
4000000000000000000000000000000000000000000000000000000000
4500000000000000000000000000000000000000000000000000000000
5000000000000000000000000000000000000000000000000000000000
5600000000000000000000000000000000000000000000000000000000
6300000000000000000000000000000000000000000000000000000000
7100000000000000000000000000000000000000000000000000000000
8000000000000000000000000000000000000000000000000000000000
9000000000000000000000000000000000000000000000000000000000
10000000000000000000000000000000000000000000000000000000000
11000000000000000000000000000000000000000000000000000000000
12500000000000000000000000000000000000000000000000000000000
14000000000000000000000000000000000000000000000000000000000
16000000000000000000000000000000000000000000000000000000000
18000000000000000000000000000000000000000000000000000000000
20000000000000000000000000000000000000000000000000000000000
22000000000000000000000000000000000000000000000000000000000
25000000000000000000000000000000000000000000000000000000000
28000000000000000000000000000000000000000000000000000000000
32000000000000000000000000000000000000000000000000000000000
36000000000000000000000000000000000000000000000000000000000
40000000000000000000000000000000000000000000000000000000000
45000000000000000000000000000000000000000000000000000000000
50000000000000000000000000000000000000000000000000000000000
56000000000000000000000000000000000000000000000000000000000
63000000000000000000000000000000000000000000000000000000000
71000000000000000000000000000000000000000000000000000000000
80000000000000000000000000000000000000000000000000000000000
90000000000000000000000000000000000000000000000000000000000
100000000000000000000000000000000000000000000000000000000000
110000000000000000000000000000000000000000000000000000000000
125000000000000000000000000000000000000000000000000000000000
140000000000000000000000000000000000000000000000000000000000
160000000000000000000000000000000000000000000000000000000000
180000000000000000000000000000000000000000000000000000000000
200000000000000000000000000000000000000000000000000000000000
220000000000000000000000000000000000000000000000000000000000
250000000000000000000000000000000000000000000000000000000000
280000000000000000000000000000000000000000000000000000000000
320000000000000000000000000000000000000000000000000000000000
360000000000000000000000000000000000000000000000000000000000
400000000000000000000000000000000000000000000000000000000000
450000000000000000000000000000000000000000000000000000000000
500000000000000000000000000000000000000000000000000000000000
560000000000000000000000000000000000000000000000000000000000
630000000000000000000000000000000000000000000000000000000000
710000000000000000000000000000000000000000000000000000000000
800000000000000000000000000000000000000000000000000000000000
900000000000000000000000000000000000000000000000000000000000
1000000000000000000000000000000000000000000000000000000000000
1100000000000000000000000000000000000000000000000000000000000
1250000000000000000000000000000000000000000000000000000000000
1400000000000000000000000000000000000000000000000000000000000
1600000000000000000000000000000000000000000000000000000000000
1800000000000000000000000000000000000000000000000000000000000
2000000000000000000000000000000000000000000000000000000000000
2200000000000000000000000000000000000000000000000000000000000
2500000000000000000000000000000000000000000000000000000000000
2800000000000000000000000000000000000000000000000000000000000
3200000000000000000000000000000000000000000000000000000000000
3600000000000000000000000000000000000000000000000000000000000
4000000000000000000000000000000000000000000000000000000000000
4500000000000000000000000000000000000000000000000000000000000
5000000000000000000000000000000000000000000000000000000000000
5600000000000000000000000000000000000000000000000000000000000
6300000000000000000000000000000000000000000000000000000000000
7100000000000000000000000000000000000000000000000000000000000
8000000000000000000000000000000000000000000000000000000000000
9000000000000000000000000000000000000000000000000000000000000
10000000000000000000000000000000000000000000000000000000000000
11000000000000000000000000000000000000000000000000000000000000
12500000000000000000000000000000000000000000000000000000000000
14000000000000000000000000000000000000000000000000000000000000
16000000000000000000000000000000000000000000000000000000000000
18000000000000000000000000000000000000000000000000000000000000
20000000000000000000000000000000000000000000000000000000000000
22000000000000000000000000000000000000000000000000000000000000
25000000000000000000000000000000000000000000000000000000000000
28000000000000000000000000000000000000000000000000000000000000
32000000000000000000000000000000000000000000000000000000000000
36000000000000000000000000000000000000000000000000000000000000
40000000000000000000000000000000000000000000000000000000000000
45000000000000000000000000000000000000000000000000000000000000
50000000000000000000000000000000000000000000000000000000000000
56000000000000000000000000000000000000000000000000000000000000
63000000000000000000000000000000000000000000000000000000000000
71000000000000000000000000000000000000000000000000000000000000
80000000000000000000000000000000000000000000000000000000000000
90000000000000000000000000000000000000000000000000000000000000
100000000000000000000000000000000000000000000000000000000000000
110000000000000000000000000000000000000000000000000000000000000
125000000000000000000000000000000000000000000000000000000000000
140000000000000000000000000000000000000000000000000000000000000
160000000000000000000000000000000000000000000000000000000000000
180000000000000000000000000000000000000000000000000000000000000
200000000000000000000000000000000000000000000000000000000000000
220000000000000000000000000000000000000000000000000000000000000
250000000000000000000000000000000000000000000000000000000000000
280000000000000000000000000000000000000000000000000000000000000
320000000000000000000000000000000000000000000000000000000000000
360000000000000000000000000000000000000000000000000000000000000
400000000000000000000000000000000000000000000000000000000000000
450000000000000000000000000000000000000000000000000000000000000
500000000000000000000000000000000000000000000000000000000000000
560000000000000000000000000000000000000000000000000000000000000
630000000000000000000000000000000000000000000000000000000000000
710000000000000000000000000000000000000000000000000000000000000
800000000000000000000000000000000000000000000000000000000000000
900000000000000000000000000000000000000000000000000000000000000
1000000000000000000000000000000000000000000000000000000000000000
1100000000000000000000000000000000000000000000000000000000000000
1250000000000000000000000000000000000000000000000000000000000000
1400000000000000000000000000000000000000000000000000000000000000
1600000000000000000000000000000000000000000000000000000000000000
1800000000000000000000000000000000000000000000000000000000000000
2000000000000000000000000000000000000000000000000000000000000000
2200000000000000000000000000000000000000000000000000000000000000
2500000000000000000000000000000000000000000000000000000000000000
2800000000000000000000000000000000000000000000000000000000000000
3200000000000000000000000000000000000000000000000000000000000000
3600000000000000000000000000000000000000000000000000000000000000
4000000000000000000000000000000000000000000000000000000000000000
4500000000000000000000000000000000000000000000000000000000000000
5000000000000000000000000000000000000000000000000000000000000000
5600000000000000000000000000000000000000000000000000000000000000
6300000000000000000000000000000000000000000000000000000000000000
7100000000000000000000000000000000000000000000000000000000000000
8000000000000000000000000000000000000000000000000000000000000000
9000000000000000000000000000000000000000000000000000000000000000
10000000000000000000000000000000000000000000000000000000000000000
11000000000000000000000000000000000000000000000000000000000000000
12500000000000000000000000000000000000000000000000000000000000000
14000000000000000000000000000000000000000000000000000000000000000
16000000000000000000000000000000000000000000000000000000000000000
18000000000000000000000000000000000000000000000000000000000000000
20000000000000000000000000000000000000000000000000000000000000000
22000000000000000000000000000000000000000000000000000000000000000
25000000000000000000000000000000000000000000000000000000000000000
28000000000000000000000000000000000000000000000000000000000000000
32000000000000000000000000000000000000000000000000000000000000000
36000000000000000000000000000000000000000000000000000000000000000
40000000000000000000000000000000000000000000000000000000000000000
45000000000000000000000

```
HSTG4*NIAG3(1).SUBPEAK(22)
      C     NIAGARA PEAK PROGRAM- CALCULATION OF PEAK VALUES
      C     FOR EACH STATION BASED ON MONTH,PECK DAYTIME DISCHARGE(QBECK)
      C     BECK AND CASCADES DAYTIME DISCHARGE(QBAC) AND
      C     DECEW DISCHARGE (DISDEC)
            COMPILER (XM=1)
            SUBROUTINE PEAK(NOY,MS,MF)
            COMMON QBAC(100,12),QBECK(100,12),DISDEC(100,12),
           1POP(100,12),PCNP(100,12),PDEC(100,12),PBK(100,12),
           1PTOT(100,12),PTOTA(100,12),P(1200),S(1200),MOR(1200)
            DO 200 I=1,NOY
            DO 300 J=MS,MF
      C     WRITE(6,333)I,J,QBECK(I,J),QBAC(I,J)
      C     FORMAT(I2,1X,J2,1X,'QBECK= ',F8.0,5X,'QBAC= ',F8.0)
            IF(J.LT.4.OR.J.GT.10)GO TO 10
            POP(I,J)=0.011475**QBAC(I,J)-625.98361
            IF(POP(I,J).GT.105.0)POP(I,J)=105.0
            IF(POP(I,J).LT.0.0)POP(I,J)=0.0
            PCNP(I,J)=0.0076*QBAC(I,J)-462.978
            IF(PCNP(I,J).GT.75.0)PCNP(I,J)=75.0
            IF(PCNP(I,J).LT.0.0)PCNP(I,J)=0.0
            IF(QBECK(I,J).GT.55500.)GO TO 20
            IF(QBECK(I,J).GT.51000..AND.QBECK(I,J).LE.55500.)GO TO 30
            IF(QBECK(I,J).GT.41000..AND.QBECK(I,J).LE.51000.)GO TO 40
            IF(QBECK(I,J).GT.28000..AND.QBECK(I,J).LE.41000.)GO TO 50
            PBK(I,J)=651.14266+25.10714E-3*QBECK(I,J)-53.57143E-9
           1*QBECK(I,J)**2
            IF(PBK(I,J).LT.0.0)PBK(I,J)=0.0
            GO TO 100
      50    PBK(I,J)=818.540116+14.632403E-3*QBECK(I,J)+107.45965E-9
           1*QBECK(I,J)**2
            GO TO 100
      40    PBK(I,J)=874.97232+14.925E-3*QBECK(I,J)+66.96436E-9*QBECK(I,J)**2
            GO TO 100
      30    PBK(I,J)=-927.9*586+89.71354E-3*QBECK(I,J)-706.45217E-9
           1*QBECK(I,J)**2
            IF(PBK(I,J).GT.1875.0)PBK(I,J)=1875.0
            GO TO 100
      20    PBK(I,J)=1875.0
            GO TO 100
      10    POP(I,J)=0.0106061*QBAC(I,J)-570.60606
            IF(POP(I,J).GT.105.0)POP(I,J)=105.0
            IF(POP(I,J).LT.0.0)POP(I,J)=0.0
            PCNP(I,J)=0.003830*QBAC(I,J)-261.7826
            IF(PCNP(I,J).LT.0.0)PCNP(I,J)=0.0
            IF(PCNP(I,J).GT.75.0)PCNP(I,J)=75.0
            IF(J.LT.4)GO TO 80
            GO TO 101
      80    IF(PCNP(I,J).GT.7.6)PCNP(I,J)=7.6
      101   IF(QBECK(I,J).GT.54500.)GO TO 110
            IF(QBECK(I,J).GT.51000..AND.QBECK(I,J).LE.54500.)GO TO 120
            IF(QBECK(I,J).GT.36000..AND.QBECK(I,J).LE.51000.)GO TO 130
            PBK(I,J)=646.56548+25.6006E-3*QBECK(I,J)-63.988E-9*QBECK(I,J)**2
            IF(PBK(I,J).LT.0.0)PBK(I,J)=0.0
            GO TO 100
      130   PBK(I,J)=729.4+20.2383E-3*QBECK(I,J)+25.53817E-9*QBECK(I,J)**2
            GO TO 100
```

```
      120   PBK(I,J)=-2078.9231+0.1342256*QBECK(I,J)-1.13006E-6*QBECK(I,J)**2
            IF(PBK(I,J).GT.1880.)PBK(I,J)=1880.
            GO TO 100
      110   PBK(I,J)=1880.
      100   PDEC(I,J)=153.26575+1.484558E-3*DISDEC(I,J)-202.0055E-9
           1*DISDEC(I,J)**2
            IF(DISDEC(I,J).GE.6800.)PDEC(I,J)=154.6
            IF(DISDEC(I,J).EQ.0.0)PDEC(I,J)=0.0
            PTOT(I,J)=POP(I,J)+PCNP(I,J)+PDEC(I,J)+PBK(I,J)
            PTOTA(I,J)=PTOT(I,J)-75.0
C           WRITE(6,444)POP(I,J),PCNP(I,J),PBK(I,J),PDEC(I,J),
C          1PTOT(I,J),PTOTA(I,J)
C           FORMAT(6F8.2)
      300   CONTINUE
      200   CONTINUE
            RETURN
            END
```

@HDG ****** SUBBHW/ ******

```
@PRT,S  HSIG4*NIAG3.SUBBHW/
FURPUR 28R1.H2.6 E35 S74T11 06/11/81 10:19:47
```

-185-

```
NSTG4*NIAG3(1).SUBBHW(2)
      SUBROUTINE BHW(QTEST,EMD,MON,QB,HW)
C     HEADWATER ELEVATION CALCULATIONS FOR BECK G.S.
C     HEADWATER IS USED IN ENERGY CALCULATIONS FOR BECK
C     OUTPUT IS HEADWATER LEVEL HW AND BACK DISCHARGE QB
      DIMENSION C(5)
      IF(MON.GT.1.AND.MON.LT.6) GO TO 1
      IF(MON.GT.8) GO TO 2
      C(1)=-0.1277405E-03
      C(2)=-0.2766605E-02
      C(3)= 0.1431810E+00
      C(4)=-0.2052657E+01
      C(5)= 0.1057558E+02
      GO TO 3
    1 C(1)= 0.4084248E-03
      C(2)=-0.1404717E-01
      C(3)= 0.2154076E+00
      C(4)=-0.2123795E+01
      C(5)= 0.9633192E+01
      GO TO 3
    2 C(1)= 0.1875383E-03
      C(2)=-0.9735033E-02
      C(3)= 0.1887179E+00
      C(4)=-0.2099886E+01
      C(5)= 0.1169494E+02
    3 HW=540.0
      GO TO 4
    5 HW=HW+0.05
    4 T1=SQRT(EMD-HW)
      T4=QTEST/T1
      T2=(((EMD+HW)/2.0)-547.5)*.788
      T3=C(5)
      DO 6 I=4,1,-1
      T3=(C(5-I)*(T2**I))+T3
    6 CONTINUE
      T3=15600.0-(T3*253.807107)
      IF(HW.GT.540.0) GO TO 7
      IF(T3.LT.T4) GO TO 8
    7 IF(T3.LT.T4) GO TO 9
      QUP=T3
      HWL=HW
      GO TO 5
    9 QLOW=T3
      HW=HWL+((0.05/(QUP-QLOW))*(QUP-T4))
      QB=T4*T1
      RETURN
C     WRITE(6,500) QB,HW,MON
    8 QB=T3*T1
      RETURN
C     WRITE(6,500) QB,HW
  500 FORMAT()
      END

BHDG ****** SUBPOND/ ******
```

-186-

```
HSTG4*NIAG3(1).SUBBHW(2)
      SUBROUTINE BHW(QTEST,EMD,MON,QB,HW)
C     HEADWATER ELEVATION CALCULATIONS FOR BECK G.S.
C     HEADWATER IS USED IN ENERGY CALCULATIONS FOR BECK
C     OUTPUT IS HEADWATER LEVEL HW AND BACK DISCHARGE QB
      DIMENSION C(5)
      IF(MON.GT.1.AND.MON.LT.6) GO TO 1
      IF(MON.GT.8) GO TO 2
      C(1)=-0.1277405E-03
      C(2)=-0.2766605E-02
      C(3)= 0.1431810E+00
      C(4)=-0.2052657E+01
      C(5)= 0.1057558E+02
      GO TO 3
    1 C(1)= 0.4084248E-03
      C(2)=-0.1404717E-01
      C(3)= 0.2154076E+00
      C(4)=-0.2123795E+01
      C(5)= 0.9633192E+01
      GO TO 3
    2 C(1)= 0.1875383E-03
      C(2)=-0.9735033E-02
      C(3)= 0.1887179E+00
      C(4)=-0.2099866E+01
      C(5)= 0.1169494E+02
    3 HW=540.0
      GO TO 4
    5 HW=HW+0.05
    4 T1=SQRT(EMD-HW)
      T4=QTEST/T1
      T2=(((EMD+HW)/2.0)-547.5)*.788
      T3=C(5)
      DO 6 I=4,1,-1
      T3=(C(5-I)*(T2**I))+T3
    6 CONTINUE
      T3=15600.0-(T3*253.407107)
      IF(HW.GT.540.0) GO TO 7
      IF(T3.LT.T4) GO TO 8
    7 IF(T3.LT.T4) GO TO 9
      QUP=T3
      HWL=HW
      GO TO 5
    9 QLOW=T3
      HW=HWL+((0.05/(QUP-QLOW))*(QUP-T4))
      QB=T4*T1
      RETURN
C     WRITE(6,500) QB,HW,MON
    8 QB=T3*T1
      RETURN
C     WRITE(6,500) QB,HW
  500 FORMAT()
      END
```


-187-

```
@PRT,S  HSTG4=NIAG3.SUBPOND/
FURPUR 28R1.M2.6 E35 S7=T11 06/11/81 10:19:48
```

```
HSTG4*NIAG3(1).SUBPOND(2)
      1            SUBROUTINE POND(QOP,QCA,PD,PN,IFLAG)
      2      C     CALCULATION OF DAY/NIGHT PONDING PD, PN
      3      C     INPUT QP, DISCHARGE QOP AND CANADIAN SHARE QCA
      4      C     FLAG IFLAG=1 INDICATES PONDING ON CONDITION
      5            IF(QOP.GT.7190.)PN=7190
      6            IF(QOP.LE.7190.)PN=QOP
      7            PD=PN*(10.43/13.57)
      8            QCA=QCA-PN
      9            IFLAG=1
     10            RETURN
     11            END

@HDG  ****** SUBTOTAL/ ******

@PRT,S  HSTG4*NIAG3.SUBTOTAL/
FURPUR 28R1.M2.6 E35 S7*T11 06/11/81 10:19:49
```

```
HSTG4*NIAG3(1).SUBTOTAL(S)
      1            SUBROUTINE TOTAL(ETD,ETN,PEAT,NOY,MS,MF)
      2      C     SETS UP MATRIX MW FOR OUTPUT ONTO MASTER TAPE
      3      C     INPUT IS TOTAL DAY, TOTAL NIGHT ENERGIES AND PEAK
      4            COMMON MW(12,100,3)
      5            DIMENSION ETD(100,12),ETN(100,12),PEAT(100,12)
      6            DO 10 K=1,3
      7            DO 20 J=1,NOY
      8            DO 30 I=MS,MF
      9            IF(K.EQ.1)MW(I,J,K)=ETD(J,I)*0.5
     10            IF(K.EQ.2)MW(I,J,K)=ETN(J,I)*0.5
     11      30    IF(K.EQ.3)MW(I,J,K)=PEAT(J,I)*0.5
     12      20    CONTINUE
     13      10    CONTINUE
     14            RETURN
     15            END

@HDC  ****** MWLZW1/ ******

@PRT,S  HSTG4*NIAG3.MWLZW1/
FURPUR 28R1.M2.6 E35 S74TII 06/11/81 10:19:50
```

```
MSTG4*NIAG3(1).MWLZW1(12)
      1          SUBROUTINE TWRITE(IYR1,INDEX,IH)                          Y
      2      C   SUBROUTINE THAT OUTPUTS MW MATRIX TO MASTER MAGNETIC TAPE
      3      C   INPUT IS START YEAR IYR1, TOTAL NO. OF YRS INDEX AND HEADING IH
      4      C   MATRIX MW TRANSFERED BY COMMON STATEMENT
      5          COMMON MW(12,100,3)
      6          DIMENSION NEXTID(5),XVAL(12,3),JHDG(5),IH(4)              Y
      7          INTEGER XVAL                                              Y
      8          DATA JHDG(5)/4HNIAG/
      9          IFLAG = 0
     10          DO 97 I = 1,4                                             Y
     11       97 JHDG(I) = IH(I)                                           Y
     12        1 READ(8) NEXTID,NYRS                                       Y
     13          IF(IFLAG.EQ.1.AND.NEXTID(1).EQ.4H9999) GO TO 99
     14          IF(IFLAG.EQ.1) GO TO 2
     15          IF(NEXTID(1).EQ.4H9999) GO TO 5
     16          DO 7 I = 1,5                                              Y
     17          IF(NEXTID(I).GT.JHDG(I)) GO TO 5                          Y
     18          IF (NEXTID(I).LT.JHDG(I))GO TO 2                          Y
     19        7 CONTINUE                                                  Y
     20          GO TO 10                                                  Y
     21        2 WRITE (9) NEXTID,NYRS                                     Y
     22          DO 3 I=1,NYRS                                             Y
     23          READ(8) IYEAR,XVAL                                        Y
     24        3 WRITE(9) IYEAR,XVAL                                       Y
     25          GO TO 1                                                   Y
     26       10 WRITE(6,11)                                               Y
     27       11 FORMAT(///////10X,110HIDENTIFICATION FOR NEW CASE IS THE SAME AS TH  Y
     28         *AT FOR THE PREVIOUS ONE, PREVIOUS CASE HAS BEEN DELETED FROM TAPE)   Y
     29          DO 13 I=1,NYRS                                            Y
     30       13 READ(8) IYEAR,XVAL                                        Y
     31          READ(8) NEXTID,NYRS                                       Y
     32        5 WRITE(6,105) JHDG
     33      105 FORMAT(1H1,9X, 6HSTUDY(,5A4, 26H) IS BEING WRITTEN ON TAPE)
     34          WRITE(9) JHDG,INDEX
     35          IFLAG = 1
     36          IYR1=IYR1-1
     37          DO 20 J=1,INDEX                                           Y
     38          DO 16 K=1,3                                               Y
     39          DO 16 I=1,12
     40       16 XVAL(I,K) = MW(I,J,K)
     41          IYEAR = IYR1+J                                            Y
     42          WRITE(9) IYEAR,XVAL                                       Y
     43       20 CONTINUE                                                  Y
     44          IF(NEXTID(1).NE.4H9999) GO TO 2
     45       99 WRITE(9) NEXTID,NYRS                                      Y
     46          END FILE 9                                                Y
     47          REWIND 8
     48          REWIND 9
     49          RETURN                                                    Y
     50          END                                                       Y

$HDG  ****** MWLZJ2/ ******

$PRT,S  MSTG4*NIAG3.MWLZJ2/
```

FURFUR 28R1.M2.6 E35 S74T11 06/11/81 10:19:50

```
****** MWL7J2/          ******                                   DATE 061181      PAGE  22

HST6$*NIAG3(1).MWL2J2(6)
      1          SUBROUTINE PGS1(DAYMWH,EVEMWH,0,JMONTH)
      2      C   CALCULATION OF PGS GAIN/LOSS IN MWHH
      3          REAL IRFLOW
      4          IRFLOW=0
      5      C
      6          DIMENSION CDGTS(3,4),CDGNTS(3,4),CNLTS(3),CNLNTS(3),RANGE(4,2)
      7      C
      8          DATA ((CDGTS(I,J),I=1,3),J=1,4) /.4837777?E+04,.4444436?E-03,0.0,
      9         *     .60299986E+04,-.59999926E-02,0.0,-.20085164E+05,.2469465E+00,
     10         *    -.6123920?E-06,.3550809E+05,-.2532536?E+00,.5126367?E-06/
     11          DATA ((CDGNTS(I,J),I=1,3),J=1,4) /-.5301271?E+04,.13931033E+00,
     12         *     -.47710912E-06,.31219505E+05,-.2887764?E+00,.7771286E-06,
     13         *     .62921232E+04,-.1618103?E-01,.31800356E-07,.4538005?E+04,
     14         *     -.11600247E-02,0.0/
     15          DATA  CNLTS   /0.4957626?E+04,0.49802542E-02,-0.12500668E-07/
     16          DATA  CNLNTS  /0.5117934?E+04,0.3339158E-02,-0.8037254?E-08/
     17          DATA ((RANGE(I,J),I=1,4),J=1,2) /185000.,205000.,220000.,240000.,
     18         *                                 170000.,185000.,220000.,240000./
     19      C
     20          IF (JMONTH .GE. 4 .AND. JMONTH .LE. 10)  GO TO 100
     21          EVENL = CNLNTS(1) + CNLNTS(2)*IRFLOW + CNLNTS(3)*IRFLOW*IRFLOW
     22          DO 10 I=1,4
     23          IF(Q .LE. RANGE(I,2))GO TO 20
     24       10 CONTINUE
     25          DAYGN=4260.
     26          GO TO 30
     27       20 DAYGN=CDGNTS(1,I) + CDGNTS(2,I)*IRFLOW + CDGNTS(3,I)*IRFLOW**2
     28       30 EVEMWH=EVEMWH - EVENL
     29          DAYMWH = DAYMWH + DAYGN
     30          RETURN
     31      100 EVENL = CNLTS(1)+CNLTS(2)*IRFLOW+CNLTS(3)*IRFLOW*IRFLOW
     32          DO 110 I=1,4
     33          IF(Q .LE. RANGE(I,1))GO TO 120
     34      110 CONTINUE
     35          DAYGN=4260.
     36          GO TO 130
     37      120 DAYGN=CDGTS(1,I) + CDGTS(2,I)*IRFLOW + CDGTS(3,I)*IRFLOW**2
     38      130 EVEMWH=EVEMWH - EVENL
     39          DAYMWH = DAYMWH + DAYGN
     40          RETURN
     41          END

$NDC  ****** SUBDURPLT/          ******

$PRT,S  HST6$*NIAG3.SUBDURPLT/
FURPUR 28R1.M2.6 E35 S7*T11 06/11/81 10:19:51
```

-193-

```
HSTG4*NIAG3(1).SUBOURPLT(2)
      1            SUBROUTINE OURPLT(E,PER,K,TITL,AM,IYS,IYF)
      2      C   PLOTTING ROUTINE FOR RESULTS-NOT TESTED AS OF NOV.13,1978 - NOT USED
      3            DIMENSION E(1202),PER(1202),TITL(2),AM(2)
      4            YEAR1=IYS+1900
      5            YEAR2=IYF+1900
      6            CALL PLOT(3.0,1.0,-3)
      7            CALL SYMBOL(0.0,0.0,.07,03,0.0,-1)
      8            CALL SYMBOL(0.0,11.69,.07,03,0.0,-1)
      9            CALL SYMBOL(16.54,11.69,.07,03,0.0,-1)
     10            CALL SYMBOL(16.54,0.0,.07,03,0.0,-1)
     11            CALL PLOT(1.0,.345,-3)
     12            CALL RECT(0.0,0.0,11.0,15.0,0.0,3)
     13            CALL SYMBOL(0.0,-0.5,.14,17HDURATION PLOT OF ,0.0,+17)
     14            CALL SYMBOL(999.,999.,.14,TITL,0.0,+12)
     15            CALL SYMBOL(999.,999.,.14,12H ENERGY FOR ,0.0,+12)
     16            CALL SYMBOL(999.,999.,.14,AM,0.0,+12)
     17            CALL NUMBER(999.,999.,.14,YEAR1,0.0,-1)
     18            CALL SYMBOL(999.,999.,.14,3H - ,0.0,+3)
     19            CALL NUMBER(999.,999.,.14,YEAR2,0.0,-1)
     20            CALL PLOT(1.0,1.0,-3)
     21            CALL PLOT(0.0,9.0,2)
     22            CALL PLOT(0.0,0.0,3)
     23            CALL PLOT(10.0,0.0,2)
     24            X=0.0
     25            DO 1 I=1,9
     26            Y=FLOAT(I)
     27            VAL=Y*200.
     28            CALL SYMBOL(X,Y,.07,03,0.0,-1)
     29            CALL NUMBER((X-.105),(Y-.105),.07,VAL,90.0,-1)
     30        1   CONTINUE
     31            CALL SYMBOL((X-.5),4.0,.07,18HENERGY (*1000 MWH),90.0,+18)
     32            Y=0.0
     33            DO 2 I=1,10
     34            X=FLOAT(I)
     35            VAL=X*10.0
     36            CALL SYMBOL(X,Y,.07,03,0.0,-1)
     37            CALL NUMBER((X-.07),(Y-.15),.07,VAL,0.0,-1)
     38        2   CONTINUE
     39            CALL SYMBOL(4.75,(Y-.5),.07,15HPERCENT OF TIME,0.0,+15)
     40            CALL SYMBOL(999.,999.,.07,21H EQUALLED OR EXCEEDED,0.0,+21)
     41            NK=-K
     42            E(K+1)=0.0
     43            E(K+2)=200000.0
     44            PER(K+1)=0.0
     45            PER(K+2)=10.0
     46            CALL FLINE(PER,E,NK,1,0,0)
     47            CALL PLOT(16.0,-2.345,-3)
     48            RETURN
     49            END

$HDG ****** SUBPGS/ ******

$PRT,S HSTG4*NIAG3,SUBPGS/
FURPUR 26R1.M2.6 E35 S74T11 06/11/81 10:19:51
```

```
HSTG4*NIAG3(1).SUBPGS(4)
      1            SUBROUTINE PGS(AVMW,ADJMW)
      2      C   CALCULATION OF PGS LOSS IN AVG. MW.
      3      C        AVMW=AV.MW. INPUT
      4      C        ADJMW=PGS LOSS
      5            DIMENSION C(6)
      6            DATA C0,(C(I),I=1,6)/-0.1671536,0.5288927,-0.5037727,
      7           10.2435965,-0.5849167E-01,0.7305895E-02,-0.3621186E-03/
      8            X=(AVMW-900.)/100.
      9            A=0.0
     10            DO 1 I=1,6
     11      1     A=(A+C(7-I))*X
     12            A=C0+A
     13            ADJMW=20.+20.*A
     14            RETURN
     15            END

@HOG  ****** SUBSCHEME/ ******

@PRT,S  HSTG4*NIAG3.SUBSCHEME/
FURPUR 28R1.H2.6 E3S S74T11 06/11/81 10:19:51
```

```
HSTG4*NIAG3(1).SUBSCHEME(24)
      SUBROUTINE SCHEME(ZRQ,ISCH,QI,J,ITIME,XRQ)
C     ADJUSTS L. ERIE BASE OUTFLOW ZRQ FOR L. ERIE REG. STUDY
C     ADJUSTMENTS MADE FROM DISCHARGE INCREMENT QI TAKEN
C     FROM SUBROUTINE 'ADJUST'
C     ADJUSTMENTS MADE TO BRING ZRQ TO APPROPRIATE VALUE
C     CORRESPONDING TO CANADIAN TREATY HOURS
C     ISCH IDENTIFIES WHICH SCHEME IS RUN
C     ISCH=-1 FOR SE01552
C     ISCH=0 FOR SE06L
C     ISCH=1 FOR N25 AND BASE CASE
C     ISCH=2 FOR ALL DIVERSIONS AND CONSUMPTIVE USES RUNS
      IF(QI.EQ.0.0)GO TO 89
      IF(ISCH.EQ.2)GO TO 89
      IF(ISCH)50,60,89
   50 IF(ITIME.EQ.0)GO TO 80
      XRQ=ZRQ+QI
      IF(J.GE.6.AND.J.LE.8)XRQ=ZRQ+(QI*0.8)
      IF(J.EQ.4)XRQ=(ZRQ+QI+QI/5+ZRQ+QI)/2
      IF(J.EQ.5)XRQ=ZRQ+QI+QI/5
      IF(J.EQ.11)XRQ=ZRQ+QI+QI/2
      IF(J.EQ.12)XRQ=(2*ZRQ+5*QI/2)/2
      IF(J.EQ.9)XRQ=ZRQ+QI+QI/11
      GO TO 99
   80 XRQ=ZRQ
      IF(J.GE.1.AND.J.LE.3)XRQ=ZRQ+QI
      IF(J.EQ.4.OR.J.EQ.12)XRQ=(ZRQ*2+QI)/2
      GO TO 99
   60 IF(ITIME.EQ.0)GO TO 90
      XRQ=ZRQ+QI
      IF(J.EQ.3)XRQ=(2*ZRQ+QI)/2
      IF(J.EQ.4)XRQ=(ZRQ*2+QI+QI/5)/2
      IF(J.EQ.5)XRQ=ZRQ+QI+QI/5
      IF(J.EQ.9)XRQ=ZRQ+QI+QI/11
      IF(J.EQ.11)XRQ=ZRQ+QI+QI/2
      IF(J.EQ.12)XRQ=(2*ZRQ+5*QI/2)/2
      IF(J.GE.6.AND.J.LE.8)XRQ=ZRQ+(QI*0.8)
      GO TO 99
   90 XRQ=ZRQ
      IF(J.EQ.1.OR.J.EQ.2)XRQ=ZRQ+QI
      IF(J.EQ.3.OR.J.EQ.12)XRQ=(ZRQ+(ZRQ+QI))/2
      GO TO 99
   89 XRQ=ZRQ
   99 RETURN
      END

@HOG ****** ADJUST/ ******

@PRT,S HSTG4*NIAG3.ADJUST/
FURPUR 28R1.H2.6 E35 S74T11 06/11/81 10:19:52
```

-196-

```
HSTG4*NIAG3(1).ADJUST(24)
      SUBROUTINE SUBADJ(QERIE,ERIES,J,ISCH,QBASE,QINC,AST)
C     DETERMINES BASE FLOW QBASE
C     FLOW INCREMENT QINC AND FLAGS WITH '*'
C     IF TRIGGER ON CONDITION IN L. ERIE OUTFLOW QERIE
C     ISCH DETERMINES SCHEME AS DESCRIBED UNDER SUBROUTINE 'SCHEME'
C     BASE FLOW FORMULA SUPPLIED BY U. S. CORPS OF ENGINEERS
C     ALTERED FOR RUNS R-10, R-11 IN DCU STUDY
      DIMENSION RIN(12),DIFS(12),DIFL(12),DIFX(12)
      DATA (RIN(K),K=1,12)/4.0,4.7,3.4,4.9,0.0,1.5,5.1,3.9,2.6,
     11.6,0.4,0.0/
      DATA (DIFL(K),K=1,12)/6800.,6800.,3400.,1700.,3400.,2300.,2300.,
     12300.,3400.,3400.,3400.,5100./
      DATA (DIFS(K),K=1,12)/15300.,15300.,15300.,11500.,7700.,
     15100.,5100.,5100.,7700.,7700.,7700.,11500./
      DATA (DIFX(K),K=1,12)/0.,0.,0.,0.,0.,0.,0.,0.,
     10.,0.,0.,0./
      QBASE=((ERIES-556.25)**1.5*3.665-RIN(J)+7.)*1000.
      DIF=QERIE-QBASE
C     WRITE(6,52)DIF,ISCH
C     IF(DIF.LE.1000.OR.ISCH.EQ.1)GO TO 10
C     TESTS DIFFERENCE FOR R-10, R-11 RUNS IN DIVERSION AND
C     CONSUMPTIVE USES STUDY
      IF(DIF.GT.1000..AND.ISCH.EQ.2)GO TO 40
      IF(ISCH.EQ.1)GO TO 10
      IF(ISCH.EQ.2)GO TO 10
      IF(ISCH.EQ.-1)GO TO 20
      QINC=6800.
      QBASE=QERIE-DIFL(J)
C     WRITE(6,52)QBASE,QINC,DIFL(J),QERIE
      AST='*'
      GO TO 99
   10 QBASE=QERIE
      QINC=0.
      AST=' '
      GO TO 99
   40 QBASE=QERIE
      QINC=0.
      AST='*'
      GO TO 99
   20 QINC=15300.
      QBASE=QERIE-DIFS(J)
      AST='*'
C     WRITE(6,52)QBASE
C     FORMAT()
   99 RETURN
      END
```

```
@HDG  ****** LOAD/          ******

@PRT,S  HSTG4*NIAG3.LOAD/
FURPUR 26R1.M2.6 E35 S74T11 06/11/81 10:19:52
```

-197-

```
HST04*NIAG3(1).LOAD(44)
      1            COMPILER (XM=1)
      2      C     *** NIAGARA ENERGY PROGRAMME ***
      3      C     MAIN EXECUTABLE PROGRAMME
      4      C     * VERSION REQUIRED FOR RUNS R=10, R=11 IN BCU STUDY *
      5      C     INPUT DATA FILE CONSISTS OF:
      6      C     LINE 1: STU: STUDY NAME, NO1: STUDY NUMBER,
      7      C                NO2: SECOND PART OF STUDY NO.(MAX. 6 ALPHANUMERIC CHARACTERS)
      8      C     LINE2: REPORT #,ITW=0-NO L. ONT. ELEV.,ITW=1-READ L.ONT.ELEV.
      9      C       PLOT NUMBER,1=NO PLOT,0=ACTIVATE PLOT.
     10      C     START MONTH,END MONTH,SCHEME FLAG, CAN-US  FLOW DIVERSION CONSTANT
     11      C     LINE 3: DISCHARGE FALLS DAYTIME (12 VALUES)
     12      C   LINE 4: DISCHARGE FALLS NIGHTIME (12 VALUES)
     13      C   LINE 5: LAKE ERIE ADJUSTMENTS (12 VALUES)
     14      C   LINE 6: MATERIAL DOCK ELEVATIONS (12 VALUES)
     15      C   LINE 7: TO END: YEAR/MONTH,ELEVATIONS (FT.),DISCHARGE (1000'S CFS.)
     16      C     OUTPUT BASED ON 7 REPORT TABLES
     17      C     REPORT 1: A)FLOWN TABLE SUMMARY
     18      C               B)PLANT ENERGY (MWH) TABLE SUMMARY
     19      C     REPORT 2: 1.A) PLUS B)PEAK PROGRAM CALL
     20      C          LAKE ERIE REGULATION STUDY AND DIVERSION AND CONSUMPTIVE
     21      C          USES STUDY ARE ALL REPORT 2 OUTPUTS
     22      C     REPORT 3: 1.A) PLUS B)ANNUAL TOTAL DURATION
     23      C               C)DURATION BY STATION BY MONTH
     24      C     REPORT 4: 1.A),1.B),PLUS C)MONTHLY DAYTIME DURATION
     25      C               D)MONTHLY NIGHTIME DURATION
     26      C               E)MONTHLY TOTAL DURATION
     27      C               F)ANNUAL DAYTIME TOTAL DURATION
     28      C               G)ANNUAL NIGHTIME TOTAL DURATION
     29      C               H)ANNUAL TOTAL DURATION
     30      C     REPORT 5: 1.A) PLUS B)STS ENERGY DATA FILE DUMP PLUS 3.C)
     31      C     REPORT 6: A)OVERALL MONTHLY FLOW DURATION STUDY
     32      C               B)FLOW DURATION BY MONTHS
     33      C               C)TOURIST SEASON FLOW DURATION
     34      C               D)NON-TOURIST FLOW DURATION
     35      C     REPORT 7: A)LAKE ERIE ELEV. DURATION BY MONTHS
     36      C               B)OVERALL ELEV. DURATION
     37      C               C)NAVIGATION SEASON ELEV. DURATION
     38            DIMENSION E&O(100,12),EOPD(100,12),ECNPD(100,12),ETOTD(100,12)
     39            DIMENSION EPN(100,12),EOPN(100,12),ECNPN(100,12),ETOTN(100,12)
     40            DIMENSION EOD(100,12),EON(100,12),ETOTN(100,12),TITL(2),AM(2)
     41            DIMENSION RO(100,12),EMC(12),US(1200)
     42            DIMENSION IDATE(2),ETOTY(100),IY(100),ADJ(12)
     43            DIMENSION RELE(100,12),CTOTYD(100),ETOTYN(100)
     44            DIMENSION JFW(12),ASTER(100,12),MASTER(100),IMDG(4)
     45            DIMENSION END(100,12),ENB(100,12),ENOP(100,12),ENCN(100,12)
     46            DIMENSION ETOT(100,12),QFD(12),XLEP(100,12)
     47            DIMENSION QGIP(100,12)
     48            DIMENSION RELE1(1200),IYT(1200),RNAV(1200),IYNAV(1200),
     49           1RNON(1200),IYNON(1200)
     50            DIMENSION ROT(1200),ELVONT(100,12),EOPHD(100,12),EOPHN(100,12),
     51           1RQTR(1200),IYRQTR(1200),RQNTR(1200),IYRQNT(1200)
     52            DIMENSION M1(1200),M2(1200),M3(1200),M4(1200),M5(1200)
     53            COMMON QBAC(100,12),QBCCK(100,12),DISDEC(100,12),
     54           1POP(100,12),PCNP(100,12),PDEC(100,12),PBK(100,12),
     55           1PTOT(100,12),PTOTA(100,12),P(1200),S(1200),MOP(1200)
     56            COMMON M4(12,100,3)
```

```
      CALL GETDAY(IDATE)
      LP=1
      IX=0
      INON=0
      INAV=0
      ITR=0
      INTR=0
      IFLAG=0
      PD=0.
      PN=0.
C      READ DATA FILE PARAMETERS
      READ(5,711)IHDG
711   FORMAT(1X,A44)
      READ(5,500) IP,ITW,IP,MS,MF,ISCH,VARI
      READ(5,500)(QFD(I),I=1,12)
      READ(5,500)(QFN(I),I=1,12)
      READ(5,500)(ADJ(I),I=1,12)
      READ(5,500) (EMD(I),I=1,12)
      Z1='      '
      Z2='      '
      IF(IP.EQ.0.OR.IP.GT.7) GO TO 28
      GO TO 29
28    IP=1
      Z1='RESET '
29    IF(IP.EQ.0.OR.IP.GT.5) GO TO 36
      GO TO 37
36    IP=1
      Z2='RESET '
C      WRITE INITIAL TITLES & DATA BLOCK
37    WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,211)IP,Z1,IP,Z2,(QFD(N),N=1,12),(QFN(N),N=1,12),
     1(ADJ(N),N=1,12),(EMD(N),N=1,12)
      LP=LP+1
      NOY=0
15    NOY=NOY+1
      READ(5,100,END=99) IY(NOY),MON1,(RELE(NOY,J),RQ(NOY,J),J=MON1,6)
C     WRITE(6,500) IY(NOY),MON1,(RQ(NOY,J),J=MON1,6)
      READ(5,100) IY(NOY),MON2,(RELE(NOY,J),RQ(NOY,J),J=MON2,12)
C     WRITE(6,500) IY(NOY),MON2,(RQ(NOY,J),J=MON2,12)
      GO TO 15
99    NOY=NOY-1
      MON1=1
      IF(ITW.EQ.0)GO TO 947
      DO 946 I=1,NOY
946   READ(10,322,END=947)(ELVONY(I,J),J=1,12)
C     WRITE(6,500)((I,J,NOY,ELVONY(I,J),J=1,12),I=1,NOY)
947   IYS=IY(1)
      IYEAR1=IYS+1900
      IYF=IY(NOY)
C      CALCULATE FLOWS AND AV. MW. FOR EACH STATION
      DO 26 I=1,NOY
      WRITE(6,220)IHDG,IDATE,LP
      LP=LP+1
      WRITE(6,200)
12    DO 21 J=MS,MF
      RQ(I,J)=RQ(I,J)*10.
      QIN=RQ(I,J)
```

```
      XLER(I,J)=RQ(I,J)
      ERIES=RELE(I,J)
      CALL SUBADJ(QTIN,ERIES,J,ISCH,BASE,XINC,ASTER(I,J))
      ITIME=1
C     SETS UP DAYTIME/NIGHTIME ROUTINE,ITIME=0 FOR DAY,1 FOR NIGHT
1     CALL SCHEME(BASE,ISCH,XINC,J,ITIME,QRES)
      RQ(I,J)=QRES
      IF(ITIME.EQ.0) TIME='D'
      IF(ITIME.EQ.1) TIME='N'
      IF(J.LT.4.OR.J.GT.10) GO TO 5
      TOUR=' T'
      GO TO 6
5     TOUR='NT'
C     WRITE(6,4)J,TOUR
C     FORMAT(1X,I2,5X,A2)
6     IYEAR=IYI(I)
      CALL QDEC(RELE(I,J),J,DEC)
      IF(ISCH.EQ.2.AND.ASTER(I,J).EQ.'*')DEC=6800+2000.
      IF(ISCH.EQ.2.AND.ASTER(I,J).EQ.'*')XLER(I,J)=RQ(I,J)
      IF(DEC.GT.6800.)DEC=6800.
      DISDEC(I,J)=DEC
      CALL MONTH(J,IYEAR,MO,AM)
      QGIP(I,J)=RQ(I,J)-ADJ(J)-DEC
      QLEA=RQ(I,J)-ADJ(J)
      IF(ITIME.EQ.0) QF=QFD(J)
      IF(ITIME.EQ.1) QF=QFN(J)
      QP=RQ(I,J)-QF-ADJ(J)
      QCA=(QP/2.0)+VARI/2.
      QUS=(QP/2.0)-VARI/2.
      IF(QUS.GT.102000.)QUS=102000.
C     WRITE(6,500) QCA,QUS,QP
      IF(J.LT.4.OR.J.GT.10) GO TO 10
      IF(ITIME.EQ.0) QCA=QCA+PD
10    QBC=QCA-DEC
      IF(ITIME.EQ.0)QPAC(I,J)=QBC
      CALL BHW(QBC,EMD(J),J,QB,HW)
      QC=QBC-QB
      TW=245.
      IF(ITW.EQ.1)TW=ELVONT(I,J)
      QT=QCA+QUS+QF
C     WRITE(6,500) QT,QCA,QUS,QF
C     QT=QGIP
2     TW=TW+.1
      IF(ITW.EQ.0)Q=(((((TW+248.5)/2)-225.256)
     1*(SQRT(TW-244.5)))/.00020164
      IF(ITW.EQ.1)Q=(((((TW+ELVONT(I,J))/2)-225.256)*
     1(SQRT(TW-ELVONT(I,J))))/.00020164
C     WRITE(6,500) TW,QT,Q
      IF(TW.GT.254.) WRITE(6,303) TW
      IF(TW.GT.254.) GO TO 999
      IF(Q.LT.QT) GO TO 3
      QUP=Q
      GO TO 7
3     QLOW=Q
      TWL=TW
      GO TO 2
7     TW=TWL+((0.1/(QUP-QLOW))*(QT-QLOW))
```

-200-

```
      C     WRITE(6,500) QUP,QT,QLOW,TWL
            HP=HW-TW
            CALL  CAS(QC,J,ENDR,ITIME,QR,QBA,QOP,QCNP)
            IF(ITIME.EQ.0)QBECK(I,J)=QBA
            IF(QBA.EQ.QR) GO TO 9
            CALL PHV(QBA,EMD(J),J,QB,HWA)
            HB=HWA-TW
    9       IF(QCNP.GT.9900.0)QCNP=9900.0
            IF(J.LT.4.OR.J.GT.10.OR.ITIME.EQ.0.OR.IFLAG.EQ.1)GO TO 810
            CALL POND(QOP,QCA,PO,PN,IFLAG)
            GO TO 10
  810       IF(J.LT.4.AND.QCNP.GT.1000.)QCNP=1000.
            IFLAG=0
            IF(ITIME.EQ.1) GO TO 13
            EOD(I,J)=(131./6430.)*DEC
            EBD(I,J)=(((22./291.)*HB)*QBA)/1000
            EOPD(I,J)=(QOP*12.6)/1000
            ECNPD(I,J)=(QCNP*7.6)/1000
            ETOTD(I,J)=EBD(I,J)+EOPD(I,J)+ECNPD(I,J)+EOD(I,J)
      C      OUTPUT FLOWS & AVE. HW. FOR DAYTIME HOURS
            WRITE(6,201)IY(I),AM(I),TOUR,TIME,RO(I,J),QLEA,QGIP(I,J),
           1QCA,QUS,QFC,QPC,QBA,QOP,QCNP,EOD(I,J),EBD(I,J),EOPD(I,J),
           1ECNPD(I,J),ETOTD(I,J)
            WRITE(6,502)
      26    GO TO 820
      13    EON(I,J)=(131./6430.)*DEC
            EBN(I,J)=(((22./291.)*HB)*QBA)/1000
            EOPN(I,J)=(QOP*12.6)/1000
            ECNPN(I,J)=(QCNP*7.6)/1000
            ETOTN(I,J)=EBN(I,J)+EOPN(I,J)+ECNPN(I,J)+EON(I,J)
      C      OUTPUT FLOWS & AVE. HW. FOR NIGHTIME HOURS
            WRITE(6,201)IY(I),AM(I),TOUR,TIME,RO(I,J),QLEA,QGIP(I,J),
           1QCA,QUS,DEC,QFC,QBA,QOP,QCNP,EON(I,J),EBN(I,J),EOPN(I,J),
           1ECNPN(I,J),ETOTN(I,J)
      22    ITIME=0
            GO TO 14
  820       IF(IR.LT.6)GO TO 21
      C      SET UP PARAMETERS FOR FLOW & ELEVATION DURATION REPORTS
            IX=IX+1
            RELET(IX)=RELE(I,J)
            ROT(IX)=XLER(I,J)
            M1(IX)=J
            IYT(IX)=IY(I)
            IF(J.GE.4)GO TO 680
            INON=INON+1
            RNON(INON)=RELE(I,J)
            M2(INON)=J
            IYNON(INON)=IY(I)
            GO TO 671
  680       INAV=INAV+1
            RNAV(INAV)=RELE(I,J)
            M3(INAV)=J
            IYNAV(INAV)=IY(I)
  671       IF(J.LT.4.OR.J.GT.10)GO TO 670
            ITR=ITR+1
            ROTR(ITR)=XLER(I,J)
            MR(ITR)=J
```

```
                IYROIR(ITR)=IY(I)
                GO TO 21
      670       INTR=INTR+1
                RQNTR(INTR)=XLEP(I,J)
                MS(INTR)=J
                IYRQNT(INTR)=IY(I)
      21        CONTINUE
                IMS=1
      20        CONTINUE
                IF(IR.EQ.6)GO TO 551
                IF(IR.EQ.7)GO TO 950
      C         **********************
      C              ENERGY CALCULATIONS
      C         **********************
                IMS=MS
                DO 30 I=1,NOY
                GO TO (24,23,23,24,23,24,23),IR
      24        WRITE(6,220)IMDG,IDATE,LP
                LP=LP+1
                WRITE(6,203)
      23        DO 31 J=MS,MF
                IYEAR=I
                CALL MONTH(J,IYEAR,MD,AM)
                IF(J.LT.4.OR.J.GT.10)GO TO 32
                IF(J.EQ.9)GO TO 33
                IF(J.EQ.10)GO TO 34
                F1=14.
                F2=2.
                F3=8.
                GO TO 35
      32        F1=16.
                F2=0.
                F3=8.
                GO TO 35
      33        F1=13.
                F2=3.
                F3=8.
                GO TO 35
      34        F1=12.
                F2=4.
                F3=8.
      35        EDD(I,J)=((F1*EDD(I,J))+(F2*EDN(I,J)))*MD
                EDN(I,J)=F3*EDN(I,J)*MD
                EBD(I,J)=((F1*EBD(I,J))+(F2*EBN(I,J)))*MD
                EBN(I,J)=F3*EBN(I,J)*MD
                EOPD(I,J)=((F1*EOPD(I,J))+(F2*EOPN(I,J)))*MD
                EOPN(I,J)=F3*EOPN(I,J)*MD
                ECNPD(I,J)=((F1*ECNPD(I,J))+(F2*ECNPN(I,J)))*MD
                ECNPN(I,J)=F3*ECNPN(I,J)*MD
                ETOTD(I,J)=EDD(I,J)+EBD(I,J)+EOPD(I,J)+ECNPD(I,J)
                ETOTN(I,J)=EDN(I,J)+EBN(I,J)+EOPN(I,J)+ECNPN(I,J)
                DMWH=ETOTD(I,J)/MD
                EMWH=ETOTN(I,J)/MD
                CALL PGS(DMWH,EMWH,QGIP(I,J),J)
                EOPHD(I,J)=DMWH/16.
                EOPHN(I,J)=EMWH/8.
                ETOTP(I,J)=(DMWH+EMWH)*PD
```

```
      ETOTYD(I)=ETOTYD(I)+DM*H*MD
      ETOTYN(I)=ETOTYN(I)+EM*H*MD
      ETOTY(I)=ETOTY(I)+ETOTR(I,J)
      END1(I,J)=(EDD(I,J)+EDN(I,J))/(MD*24.)
      EN31(I,J)=(EBD(I,J)+EBN(I,J))/(MD*24.)
      CALL PGS(ENB1(I,J),XLOSS)
      ENB1(I,J)=ENB1(I,J)-XLOSS
      ENOP1(I,J)=(EOPD(I,J)+EOPN(I,J))/(MD*24.)
      ENCN1(I,J)=(ECNPD(I,J)+ECNPN(I,J))/(MD*24.)
      ETOT1(I,J)=ENB1(I,J)+END1(I,J)+ENOP1(I,J)+ENCN1(I,J)-75.24
      GO TO (18,31,31,18,715,18,31),IP
   18 WRITE(6,206) IY(I),AM(1),EDD(I,J),EBD(I,J),EOPD(I,J),ECNPD(I,J),
     1ETOTD(I,J)
      WRITE(6,206) IY(I),AM(1),EDN(I,J),EBN(I,J),EOPN(I,J),ECNPN(I,J),
     1ETOTN(I,J),ETOTR(I,J)
      GO TO 31
  715 CALL PEAK(NOY,MS,MF)
      WRITE(15,710)IY(I),J,END1(I,J)
      WRITE(16,710)IY(I),J,ENB1(I,J)
      WRITE(17,710)IY(I),J,ENOP1(I,J)
      WRITE(18,710)IY(I),J,ENCN1(I,J)
      WRITE(19,710)IY(I),J,ETOT1(I,J)
      WRITE(20,710)IY(I),J,POP(I,J)
      WRITE(21,710)IY(I),J,PCNP(I,J)
      WRITE(22,710)IY(I),J,PBK(I,J)
      WRITE(23,710)IY(I),J,PDEC(I,J)
      WRITE(24,710)IY(I),J,PTOTA(I,J)
   31 CONTINUE
      I=S=1
   30 CONTINUE
      IF(IA.EQ.6.OR.IR.EQ.2)GO TO 551
      GO TO 713
C     ***************************************************
C       MONTHLY TOTAL FLOW DURATION
C     ***************************************************
  551 DO 552 J=MS,MF
      I=0
      DO 553 M=1,NOY
      I=I+1
      US(I)=XLER(M,J)
      WASTE(I)=ASTER(I,J)
  553 CONTINUE
      NS=1
      N9=1
      CALL DUR(US,I,IYS,N9,NS,VAL,VAL5)
      TITL(1)=' MONTH'
      TITL(2)='LY    '
      LC=50
      ACV=0.0
      CALL MONTH(J,0,MD,AM)
      DO 554 K=1,I
      LC=LC+1
      IF(LC.LE.62)GO TO 511
      WRITE(6,220)IMDG,IDATE,LP
      WRITE(6,556)(TITL(N),K=1,2),(AM(N),N=1,2)
      LP=LP+1
```

```
      LC=0
  511 N=MOR(K)
      ACV=ACV+XLER(N,J)
      WRITE(6,333)IY(N),S(K),MASTER(N),ACV,P(K)
  554 CONTINUE
  552 CONTINUE
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,321)
  556 FORMAT(1SX,'DURATION LISTING OF',246,' OVERALL'
     1' DISCHARGE (CFS) FOR ',246,///,
     12X,'YEAR          DISCHARGE    ACCUMULATED      PERCENT',
     1' OF TIME',/,16X,'(CFS)',9X,'VALUE',7X,
     1'EQUALLED OR EXCEEDED',/,2X,'----',10X,9('-'),6X,
     111('-'),7X,20('-'),//)
  321 FORMAT(1H1,'***MONTHLY TOTAL FLOW DURATION COMPLETED***')
      IF(IR.EQ.2)GO TO 713
C      ********OVERALL FLOW DURATION********
      NS=1
      N9=1
      CALL DUR(ROT,IX,IYS,N9,NS,VAL,VAL5)
      AM(1)='  OVER'
      AM(2)='ALL   '
      LC=50
      ACV=0.0
      DO 692 L=1,IX
      LC=LC+1
      IF(LC.LE.42)GO TO 772
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,672)(AM(N),N=1,2)
      LP=LP+1
      LC=0
  772 N=MOR(L)
      ACV=ACV+ROT(N)
      WRITE(6,696)IYT(N),M1(N),S(L),ACV,P(L)
  692 CONTINUE
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,673)
      LP=LP+1
      IF(IR.EQ.2)GO TO 713
C      ********TOURIST SEASON FLOW DURATION********
      NS=1
      N9=1
      CALL DUR(ROTR,ITR,IYS,N9,NS,VAL,VAL5)
      AM(1)='  TOUR'
      AM(2)='IST   '
      LC=50
      ACV=0.0
      DO 680 K=1,ITR
      LC=LC+1
      IF(LC.LE.42)GO TO 681
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,672)(AM(N),N=1,2)
      LP=LP+1
      LC=0
  681 N=MOR(K)
      ACV=ACV+ROTR(N)
      WRITE(6,696)IYR(N),M1(N),S(K),ACV,P(K)
```

```
      680   CONTINUE
            WRITE(6,220)IHDG,IDATE,LP
            WRITE(6,683)
            LP=LP+1
      C     **********NON-TOURIST SEASON FLOW DURATION****
            NS=1
            NF=1
            CALL DUR(PONTR,INTR,IYS,NF,NS,VAL,VAL5)
            AM(1)='NON-TO'
            AM(2)='URIST '
            LC=50
            ACV=0.0
            DO 690 K=1,INTR
            LC=LC+1
            IF(LC.LE.42)GO TO 691
            WRITE(6,220)IHDG,IDATE,LP
            WRITE(6,672)(AM(N),N=1,2)
            LP=LP+1
            LC=0
      691   N=MOR(K)
            ACV=ACV+RONTR(N)
            WRITE(6,696)IYRONT(N),MS(N),S(K),ACV,P(K)
      690   CONTINUE
            WRITE(6,220)IHDG,IDATE,LP
            WRITE(6,693)
            LP=LP+1
            IF(IN.EQ.6)GO TO 999
      C     IF(IP.NE.1) CALL PLOTS(DUM1,DUM2,IS)
      713   GO TO (999,888,72,73,370,70,370),TR
      C     ******************************
      C      PEAK CALCULATIONS AND REPORT
      C     ******************************
      888   CALL PEAK(NOY,MS,MF)
            LC=39
            DO 601 I=1,NOY
            IYEAR=IY(I)
            DO 602 J=MS,MF
            LC=LC+1
            CALL MONTH(J,IYEAR,MD,AM)
            IF(LC.GE.40)GO TO 603
            GO TO 604
      603   WRITE(6,220)IHDG,IDATE,LP
            WRITE(6,608)
            LC=0
            LP=LP+1
      604   WRITE(6,606)IY(I),AM(1),POP(I,J),PCNP(I,J),PDEC(I,J),
           1PPA(I,J),PTOT(I,J),PTOTA(I,J)
      602   CONTINUE
      601   CONTINUE
            WRITE(6,220)IHDG,IDATE,LP
            LP=LP+1
      C           ****************************
      C           MONTHLY  DURATION FOR PEAK
      C           ****************************
            DO 540 J=MS,MF
            I=0
            DO 541 M=1,NOY
```

```
      LC=LC+1
      IF(LC.LE.42) GO TO 50
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,207) (TITL(N),N=1,2),(AM(N),N=1,2)
      LP=LP+1
      LC=0
50    N=NOR(K)
      ACV=ACV+EOPHD(N,J)
      WRITE(6,208) IY(N),S(K),ACV,P(K)
51    CONTINUE
C     GO TO (61,73,61,61,73),IP
C     CALL DURPLT(S,P,I,TITL,AM,IYS,IYF)
61    CONTINUE
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,301)
      LP=LP+1
C          ****************************
C          MONTHLY NIGHTTIME DURATION
C          ****************************
      DO 63 J=MS,MF
      I=0
      DO 64 M=1,NOY
      I=I+1
      US(I)=EOPMN(M,J)
64    CONTINUE
      N5=1
      N9=I
      CALL DUR(US,I,IYS,N9,N5,VAL,VALS)
      TITL(1)='NIGHTT'
      TITL(2)='IME'
      LC=50
      ACV=0.0
      CALL MONTH(J,0,MD,AM)
      DO 52 K=1,I
      LC=LC+1
      IF(LC.LE.42) GO TO 53
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,207) (TITL(N),N=1,2),(AM(N),N=1,2)
      LP=LP+1
      LC=0
53    N=NOR(K)
      ACV=ACV+EOPMN(N,J)
      WRITE(6,208) IY(N),S(K),ACV,P(K)
52    CONTINUE
C     GO TO (63,74,63,63,74),IP
C     CALL DURPLT(S,P,I,TITL,AM,IYS,IYF)
63    CONTINUE
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,302)
      LP=LP+1
      IF(IR.LQ.4.OR.IR.EQ.2) GO TO 71
      GO TO 999
C          **********************
C          MONTHLY TOTAL DURATION
C          **********************
71    DO 65 J=MS,MF
      I=0
```

```
      DO 66 N=1,NOY
      I=I+1
      US(I)=EOPHD(N,J)+EOPHN(N,J)
   66 CONTINUE
      N5=1
      N9=1
      CALL DUR(US,I,IYS,N9,N5,VAL,VAL5)
      TITL(1)=' MONTH'
      TITL(2)='LY '
      LC=50
      ACV1=0.0
      ACV2=0.0
      ACV3=0.0
      CALL MONTH(J,0,MD,AM)
      DO 54 N=1,I
      LC=LC+1
      IF(LC.LE.42) GO TO 55
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,209) (TITL(N),N=1,2),(AM(N),N=1,2)
      LP=LP+1
      LC=0
   55 N=MOR(K)
      ACV1=ACV1+EOPHD(N,J)
      ACV2=ACV2+EOPHN(N,J)
      ACV3=ACV3+EOPHD(N,J)+EOPHN(N,J)
      WRITE(6,210) IY(N),EOPH  (N,J),ACV1,EOPHN(N,J),ACV2,S(N),ACV3,P(N)
   54 CONTINUE
C     GO TO (65,65,75,65,75),IP
C     CALL DURPLT(S,P,I,TITL,AM,IYS,IYF)
   65 CONTINUE
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,300)
      LP=LP+1
      IF(IR.EQ.4.OR.IR.EQ.2) GO TO 390
      GO TO 999
C     ********************************
C     ANNUAL DAYTIME TOTAL DURATION
C     ********************************
  390 I=0
      DO 400 N=1,NOY
      I=I+1
      US(I)=ETOTYD(N)
  400 CONTINUE
      N5=1
      N9=1
      CALL DUR(US,I,IYS,N9,N5,VAL,VAL5)
      TITL(1)='ANNUAL'
      TITL(2)='DAY'
      LC=50
      ACV=0.0
      DO 410 N=1,I
      LC=LC+1
      IF(LC.LE.42) GO TO 420
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,250)(TITL(N),N=1,2)
      LP=LP+1
      LC=0
```

```
      420   N=MOR(K)
            ACV=ACV+ETOTYD(N)
            WRITE(6,208)IY(N),S(K),ACV,P(K)
      410   CONTINUE
            AVG=ACV/I
            WRITE(6,305)AVG
      C     GO TO (430,430,430,440,440),IP
      C     CALL DURPLT(S,P,I,TITL,AM,IYS,IYF)
      430   WRITE(6,220)IHDG,IDATE,LP
            WRITE(6,306)
            LP=LP+1
      C     **********************************
      C     ANNUAL NIGHTIME TOTAL DURATION
      C     **********************************
      490   I=0
            DO 800 M=1,NOY
            I=I+1
            US(I)=ETOTYN(M)
      800   CONTINUE
            N5=1
            N9=I
            CALL DUR(US,I,IYS,N9,N5,VAL,VAL5)
            TITL(1)='ANNUAL'
            TITL(2)='NIGHT'
            LC=50
            ACV=0.0
            DO 510 K=I,I
            LC=LC+1
            IF(LC.LE.42) GO TO 520
            WRITE(6,220)IHDG,IDATE,LP
            WRITE(6,250)(TITL(N),N=1,2)
            LP=LP+1
            LC=0
      520   N=MOR(K)
            ACV=ACV+ETOTYN(N)
            WRITE(6,208)IY(N),S(K),ACV,P(K)
      510   CONTINUE
            AVG=ACV/I
            WRITE(6,307)AVG
      C     GO TO (530,530,530,540,540),IP
      C     CALL DURPLT(S,P,I,TITL,AM,IYS,IYF)
      530   WRITE(6,220)IHDG,IDATE,LP
            WRITE(6,308)
            LP=LP+1
      C           **********************
      C           ANNUAL TOTAL DURATION
      C           **********************
      72     I=0
            DO 67 M=1,NOY
            I=I+1
            US(I)=ETOTY(M)
      67    CONTINUE
            N5=1
            N9=I
            CALL DUR(US,I,IYS,N9,N5,VAL,VAL5)
            TITL(1)='ANNUAL'
            TITL(2)='      '
```

```
      LC=50
      ACV=0.0
      DO 68 K=1,I
      LC=LC+1
      IF(LC.LE.42) GO TO 56
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,250) (TITL(N),N=1,2)
      LP=LP+1
      LC=0
56    N=MON(K)
      ACV=ACV+ETOTY(N)
      WRITE(6,208) IY(N),S(K),ACV,P(K)
68    CONTINUE
      AVG=ACV/I
      WRITE(6,309) AVG
C     GO TO (77,77,77,76,76),IP
C     CALL DURPLT(S,P,I,TITL,AM,IYS,IYF)
77    WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,304)
      LP=LP+1
      IF(IR.EQ.4.OR.IR.EQ.2) GO TO 999
      GO TO 370
C     ****************************************
C      DURATION BY STATION BY MONTH
C     ****************************************
370   N9=0
      NS=0
      DO 103 K=1,5
      DO 105 J=MS,MF
      I=0
      DO 110 M=1,NOY
      I=I+1
      GO TO (115,120,125,130,426),K
115   US(I)=ENDI(M,J)
      GO TO 110
120   US(I)=ENBI(M,J)
      GO TO 110
125   US(I)=ENOPI(M,J)
      GO TO 110
130   US(I)=ENCNI(M,J)
      GO TO 110
426   US(I)=ETOTI(M,J)
110   CONTINUE
      CALL DUR(US,I,IYS,9,NS,VAL,VALSD)
      TITL(1)=' MONTH'
      TITL(2)='LY     '
      LC=50
      ACVD=0.0
      IYR=0
      CALL MONTH(J,IYR,MD,AM)
      DO 135 L=1,I
      LC=LC+1
      IF(LC.LE.42)GO TO 161
      WRITE(6,220)IHDG,IDATE,LP
      GO TO (140,145,150,155,156),K
140   STA='DECEM'
      WRITE(6,320)(TITL(N),N=1,2),(AM(N),N=1,2),STA
```

```
      GO TO 160
  145 STA='B+PGS'
      WRITE(6,320)(TITL(N),N=1,2),(AM(N),N=1,2),STA
      GO TO 160
  150 STA='  O.P'
      WRITE(6,320)(TITL(N),N=1,2),(AM(N),N=1,2),STA
      GO TO 160
  155 STA=' CNP.'
      WRITE(6,320)(TITL(N),N=1,2),(AM(N),N=1,2),STA
      GO TO 160
  156 STA='ALL-75'
      WRITE(6,320)(TITL(N),N=1,2),(AM(N),N=1,2),STA
  160 LP=LP+1
      LC=0
  161 N=POR(L)
      GO TO (165,170,175,180,181),K
  165 ACVD=ACVD+END1(N,J)
      WRITE(6,208)IY(N),S(L),ACVD,P(L)
      GO TO 135
  170 ACVD=ACVD+ENB1(N,J)
      WRITE(6,208)IY(N),S(L),ACVD,P(L)
      GO TO 135
  175 ACVD=ACVD+ENOP1(N,J)
      WRITE(6,208)IY(N),S(L),ACVD,P(L)
      GO TO 135
  180 ACVD=ACVD+ENCN1(N,J)
      WRITE(6,208)IY(N),S(L),ACVD,P(L)
      GO TO 135
  181 ACVD=ACVD+ETOT1(N,J)
      WRITE(6,208)IY(N),S(L),ACVD,P(L)
  135 CONTINUE
      WRITE(6,360)VAL50,VAL
C     GO TO (105,105,105,362,362),IP
C     CALL DURPLT(S,P,I,TITL,AM,IYS,IYF)
  105 CONTINUE
  103 CONTINUE
      WRITE(6,220)IHUG,IDATE,LP
      WRITE(6,365)
      LP=LP+1
      IF(IR.EQ.3)GO TO 999
C     ***************************************
C      DURATION BY STATION BY MONTH FOR PEAK
C     ***************************************
      N9=0
      N5=0
      DO 570 K=1,5
      DO 571 J=MS,MF
      I=0
      DO 572 M=1,NOY
      I=I+1
      GO TO (560,561,562,563,564),K
  560 US(I)=PDEC(M,J)
      GO TO 572
  561 US(I)=PBK(M,J)
      GO TO 572
  562 US(I)=POP(M,J)
      GO TO 572
```

-210-

```
      563   US(I)=PCNP(N,J)
            GO TO 572
      564   US(I)=PTOTA(N,J)
      572   CONTINUE
            CALL DUR(US,I,IYS,N9,N5,VAL,VALSO)
            TITL(1)=' MONTH'
            TITL(2)='LY    '
            LC=50
            ACVD=0.0
            IYR=0
            CALL MONTH(J,IYR,MO,AM)
            DO 590 L=1,I
            LC=LC+1
            IF(LC.LE.42)GO TO 591
            WRITE(6,220)IHDG,IDATE,LP
            GO TO (592,593,594,595,596),K
      592   STA='DECEW'
            WRITE(6,599)(TITL(N),N=1,2),(AM(N),N=1,2),STA
            GO TO 580
      593   STA='NECK'
            WRITE(6,599)(TITL(N),N=1,2),(AM(N),N=1,2),STA
            GO TO 580
      594   STA='  O.P'
            WRITE(6,599)(TITL(N),N=1,2),(AM(N),N=1,2),STA
            GO TO 580
      595   STA=' CNP.'
            WRITE(6,599)(TITL(N),N=1,2),(AM(N),N=1,2),STA
            GO TO 580
      596   STA='ALL-75'
            WRITE(6,599)(TITL(N),N=1,2),(AM(N),N=1,2),STA
      580   LP=LP+1
            LC=0
      591   N=MOR(L)
            GO TO (531,532,533,534,535),K
      531   ACVD=ACVD+PDEC(N,J)
            WRITE(6,208)IY(N),S(L),ACVD,P(L)
            GO TO 590
      532   ACVD=ACVD+PRK(N,J)
            WRITE(6,208)IY(N),S(L),ACVD,P(L)
            GO TO 590
      533   ACVD=ACVD+POP(N,J)
            WRITE(6,208)IY(N),S(L),ACVD,P(L)
            GO TO 590
      534   ACVD=ACVD+PCNP(N,J)
            WRITE(6,208)IY(N),S(L),ACVD,P(L)
            GO TO 590
      535   ACVD=ACVD+PTOTA(N,J)
            WRITE(6,208)IY(N),S(L),ACVD,P(L)
      590   CONTINUE
            WRITE(6,360)VALSO,VAL
      C     GO TO (105,105,105,362,362),IP
      C     CALL DURPLT(S,P,1,TITL,AM,IYS,IYF)
      571   CONTINUE
      570   CONTINUE
            WRITE(6,220)IHDG,IDATE,LP
            WRITE(6,365)
            LP=LP+1
```

```
      GO TO 999
C     ***MONTHLY ELEVATION DURATION***
950   DO 620 J=MS,MF
      I=0
      DO 621 M=1,NOY
      I=I+1
      US(I)=RELE(M,J)
621   CONTINUE
      N5=1
      N9=1
      CALL DURIUS,I,IYS,N9,N5,VAL,VAL5)
      TITL(1)='  LAKE'
      TITL(2)='  ERIE'
      LC=50
      ACV=0.0
      CALL  MONTH(J,0,MO,AM)
      DO 771 K=1,I
      LC=LC+1
      IF(LC.LE.42)GO TO 622
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,624)(TITL(N),N=1,2),(AM(N),N=1,2)
      LP=LP+1
      LC=0
622   N=MOR(K)
      ACV=ACV+RELE(N,J)
      WRITE(6,208)IY(N),S(K),ACV,P(K)
771   CONTINUE
620   CONTINUE
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,626)
      LP=LP+1
C     ***OVERALL ELEVATION DURATION***
      N5=1
      N9=1
      CALL DURIRELET,IX,IYS,N9,N5,VAL,VAL5)
      AM(1)='  OVER'
      AM(2)='-ALL  '
      LC=50
      ACV=0.0
      DO 630 K=1,IX
      LC=LC+1
      IF(LC.LE.42)GO TO 631
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,636)(AM(N),N=1,2)
      LP=LP+1
      LC=0
631   N=MOR(K)
      ACV=ACV+RELE(N)
      WRITE(6,696)IY(N),M1(N),S(K),ACV,P(K)
630   CONTINUE
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,632)
      LP=LP+1
C     *****NAVIGATION SEASON ELEV. DURATION****
      N5=1
      N9=1
      CALL DURIRNAV,INAV,IYS,N9,N5,VAL,VAL5)
```

```
      I=I+1
      US(I)=PTOT(M,J)
  541  CONTINUE
      N5=1
      N9=1
      CALL DUR(US,I,IYS,N9,N5,VAL,VAL5)
      TITL(1)='  OVER'
      TITL(2)='ALL'
      LC=56
      ACV=0.0
      CALL MONTH(J,0,MD,AM)
      DO 542 K=1,I
      LC=LC+1
      IF(LC.LE.42) GO TO 543
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,521) (TITL(N),N=1,2),(AM(N),N=1,2)
      LP=LP+1
      LC=0
  543  M=MOR(K)
      ACV=ACV+PTOT(M,J)
      WRITE(6,208) IY(M),S(K),ACV,P(K)
  542 CONTINUE
C     GO TO (61,73,61,61,73),IP
C     CALL DURPLT(S,P,I,TITL,AM,IYS,IYF)
  540 CONTINUE
      WRITE(6,220)IHDG,IDATE,LP
      WRITE(6,301)
      LP=LP+1
      WRITE(6,607)
      IF(IR.EQ.2)GO TO 70
      GO TO 999
  606 FORMAT(1X,'19',I2,1X,A3,1X,5F14.2,F18.2)
  608 FORMAT(38X,'NIAGARA AREA (ONTARIO)',/,38X,22('-'),///,
     1' YEAR/MONTH',4X,'O.P. PEAK',5X,'CNP. PEAK',4X,'DECEW PEAK',
     15X,'SECK PEAK',9X,'TOTAL',4X,'ADJUSTED TOTAL',/,17X,'(MW)',
     110X,'(MW)',10X,'(MW)',10X,'(MW)',13X,'(MW)',3X,'(TOTAL-75MW)',
     1/,10('-'),5X,9('-'),5X,9('-'),4X,10('-'),5X,9('-'),9X,5('-'),
     14X,15('-'),//)
  607 FORMAT('*** PEAK PROGRAM COMPLETED****')
C          ****************************
C          MONTHLY   DAYTIME CUPATION FOR ENERGY
C          ****************************
   70 DO 61 J=MS,MF
      I=0
      DO 62 M=1,NOY
      I=I+1
      US(I)=EOPHD(M,J)
   62 CONTINUE
      N5=1
      N9=1
      CALL DUR(US,I,IYS,N9,N5,VAL,VAL5)
      TITL(1)='  DAYT'
      TITL(2)='IME'
      LC=56
      ACV=0.0
      CALL MONTH(J,0,MD,AM)
      DO 51 M=1,I
```

```
      TITL(1)='NAVIG'
      TITL(2)='ATION '
      LC=50
      ACV=0.0
      DO 650 K=1,INAV
      LC=LC+1
      IF(LC.LE.42)GO TO 651
      WRITE(6,220)IHOG,IDATE,LP
      WRITE(6,636)(TITL(N),N=1,2)
      LP=LP+1
      LC=0
651   N=MOR(K)
      ACV=ACV+RNAV(N)
      WRITE(6,696)IYNAV(N),M3(N),S(K),ACV,P(K)
650   CONTINUE
      WRITE(6,220)IHOG,IDATE,LP
      WRITE(6,653)
      LP=LP+1
C     ***NON-NAVIGATION SEASON ELEV. DURATION****
      N5=1
      N9=1
      CALL DUR(RNON,INON,IYS,N9,N5,VAL,VAL5)
      TITL(1)='  NON-'
      TITL(2)='NAVIG '
      LC=50
      ACV=0.0
      DO 660 K=1,INON
      LC=LC+1
      IF(LC.LE.42)GO TO 661
      WRITE(6,220)IHOG,IDATE,LP
      WRITE(6,636)(TITL(N),N=1,2)
      LP=LP+1
      LC=0
661   N=MOR(K)
      ACV=ACV+RNON(N)
      WRITE(6,696)IYNON(N),M2(N),S(K),ACV,P(K)
660   CONTINUE
      WRITE(6,220)IHOG,IDATE,LP
      WRITE(6,663)
      LP=LP+1
999   IF(IR.EQ.2)CALL TOTAL(EOPHD,EOPHN,PTOT,NOY,MS,MF)
      IF(IR.EQ.2)CALL TWRITE(IYEAR1,NOY,IHOG)
      STOP
710   FORMAT('19',2I2,5X,F12.2)
745   FORMAT(10X,'CHRONOLOGICAL LISTING OF-',/,
     110X,'(A) BECK + CASCADES DAYTIME DISCHARGE(CFS/1000)',/,
     110X,'(B) BECK DAYTIME DISCHARGE(CFS/1000)',//,
     110X,'YEAR      MONTH      BECK+CASC          BECK',/,
     122X,'CFS/1000',8X,'CFS/1000',/,10X,9('-'),6X,5('-'),
     16X,9('-'),8X,8('-'))
735   FORMAT(10X,'19',I2,8X,I2,9X,F7.0,10X,F7.0)
740   FORMAT('***CHRONOLOGICAL LIST OF DISCHARGE COMPLETE***')
930   FORMAT(15X,'DURATION LISTING OF ',A3,A4,2X,'DISCHARGE',
     1'(C.F.S./1000)',/,15X,'FOR ',2A4,/,
     115X,'STATION = ',A12,//,
     12X,'YEAR        DISCHARGE   ACCUMULATED       PERCENT',
     1' OF TIME',/,16X,'(CFS/1000)',6X,'VALUE',8X,'EQUALLED OR EXCEEDED'
```

```
      1,/,2X,'----',9X,10('-'),2X,13('-'),9X,6('-'),//)
  955 FORMAT('***DISCHARGE DURATION COMPLETED***')
  100 FORMAT(2X,2I2,4X,6(F5.2,F5.0))
  101 FORMAT(I1,A1,2F6.0)
  701 FORMAT(1X,I1,A1,2F6.0)
  500 FORMAT()
  501 FORMAT(1H1)
  502 FORMAT(1X)
  200 FORMAT(37X,'FLOW IN CFS',48X,'CANADA ENERGY OUTPUT (AVE.MW.)',/,
     196X,'TREATY HOURS-NO PGS',/,15X,78('-'),2X,34('-'),/,
     11X,' YEAR/          LAKE   L.ERIE    TO       TO       TO',
     1'      TO     BECK &     TO       TO       TO     DECEW   BECK',
     1'     OP      CNP   TOTAL',/,1X,'   MONTH        ERIE   ADJUST',
     1'   BIP     CANADA   USA      DECEW CASCADES',
     1'  BECK      OP       CNP',/,
     11X,'--------      ',10('------- '),5(' ------'),//)
  201 FORMAT(1X,'19',J2,1X,A3,1X,A2,A1,1X,10F8.0,5F7.1)
  202 FORMAT(I4,1X,A3,5F10.2)
  203 FORMAT(30X,'PLANT ENERGY (MWH)',//,
     115X,57('-'),/,
     11X,'YEAR/',11X,'DECEW',8X,'BECK',9X,'OP',9X,'CNP',8X,'TOTAL ',
     1'    MONTHLY',/,3X,'MONTH',68X,'TOTAL',/,12X,6('   ---------'),//)
  204 FORMAT(1X,'19',J2,1X,A3,' N ',6F12.2)
  206 FORMAT(1X,'19',J2,1X,A3,' D ',5F12.2)
  333 FORMAT(2X,'19',J2,7X,F12.2,A1,2F15.2)
  [illegible] FORMAT(2X,'19',J2,7X,F12.2,2F15.2)
  521 FORMAT(15X,'DURATION LISTING OF ',A6,A3,' PEAK FOR ',
     12A6,///,
     12X,'YEAR              PEAK        ACCUMULATED        PERCENT',
     1' OF TIME',/,17X,'      ',8X,'VALUE',8X,'EQUALLED OR EXCEEDED',/,
     12X,'----',9X,10('-'),2X,13('-'),9X,6('-'),//)
  207 FORMAT(15X,'DURATION LISTING OF ',A6,A3,' ENERGY FOR ',
     12A6,' (MW.-OP. HOURS)',///,
     12X,'YEAR              ENERGY      ACCUMULATED        PERCENT',
     1' OF TIME',/,17X,'(MW )',8X,'VALUE',8X,'EQUALLED OR EXCEEDED',/,
     12X,'----',9X,10('-'),2X,13('-'),9X,6('-'),//)
  210 FORMAT(2X,'19',J2,1X,3(F10.0,F13.0),F13.2)
  209 FORMAT(15X,'DURATION LISTING OF ',A6,A3,' ENERGY FOR ',
     12A6,' (MW.-OP. HOURS)',///,
     115X,'DAYTIME',16X,'NIGHTTIME',14X,'TOTAL',//,
     12X,'YEAR ',3('   ENERGY   ACCUMULATED'),'   PERCENT OF TIME',/,
     14X,3('      (MW )        VALUE'),4X,'EQUALLED OR EXCEEDED',/,
     17X,3(3X,'------',3X,11('-')),7X,'------',//)
  211 FORMAT(10X,'REPORT TYPE : ',J2,1X,A6,/,
     110X,'PLOT   TYPE : ',J2,1X,A6,///,
     110X,'FLOW OVER NIAGARA FALLS',/,
     110X,'DAYTIME FLOW BY MONTH (CFS)',/,10X,12F7.0,//,
     110X,'NIGHTTIME FLOW BY MONTH (CFS)',/,10X,12F7.0,///,
     110X,'MONTHLY ADJUSTMENTS (CFS)',//,10X,12F7.0,///,
     110X,'MONTHLY MATERIAL DOCK ELEVATION  (FT)',//,10X,12F8.2,///)
  220 FORMAT(1H1,15X,4A4,5X,'NIAGARA AREA',
     149X,2A6,' PAGE : ',I3,///)
  300 FORMAT(' *** MONTHLY TOTAL DURATION AND/OR PLOT COMPLETED ***')
  301 FORMAT(' *** MONTHLY (D) DURATION AND/OR PLOT COMPLETED ***')
  302 FORMAT(' *** MONTHLY (N) DURATION AND/OR PLOT COMPLETED ***')
  303 FORMAT(1H1,'*** BECK TAIL WATER ELEVATION = ',F5.1)
  304 FORMAT(' *** ANNUAL DURATION AND/OR PLOT COMPLETED ***')
```

-215-

```
1026      305   FORMAT(//,2X,'AVG.ANNUAL DAYTIME ENERGY=',2X,F15.2)
1027      306   FORMAT('***ANNUAL DAYTIME DURATION AND/OR PLOT COMPLETED
1028           1***')
1029      307   FORMAT(//,2X,'AVG.ANNUAL NIGHTIME ENERGY=',2X,F15.2)
1030      308   FORMAT('***ANNUAL NIGHTIME DURATION AND/OR PLOT
1031           1COMPLETED***')
1032      322   FORMAT(10X,12F5.2)
1033      309   FORMAT(//,2X,'AVG.ANNUAL TOTAL ENERGY=',2X,F15.2)
1034      280   FORMAT(5X,'DURATION LISTING OF ',A8,1X,A8,'TOTAL ENERGY',///,
1035           12X,'YEAR          ENERGY     ACCUMULATED       PERCENT',
1036           1' OF TIME',/,17X,'(MWH)',8X,'VALUE',8X,'EQUALLED OR EXCEEDED',/,
1037           12X,'----',9X,10('-'),2X,13('-'),9X,6('-'),///)
1038      320   FORMAT(15X,'DURATION LISTING OF ',A6,A3,' ENERGY ',
1039           1'(AVE.MW-OPERATING HRS.)',/,15X,'FOR ',2A6,/,
1040           115X,'STATION = ',A12,///,
1041           12X,'YEAR          ENERGY     ACCUMULATED       PERCENT',
1042           1' OF TIME',/,16X,'(AVE.MW)',6X,'VALUE',8X,'EQUALLED OR EXCEEDED',/,
1043           12X,'----',9X,10('-'),2X,13('-'),9X,6('-'),///)
1044      599   FORMAT(15X,'DURATION LISTING OF ',A6,A3,' PEAK ',
1045           1'(PEAK MW.)',/,15X,'FOR ',2A6,/,
1046           115X,'STATION = ',A12,///,
1047           12X,'YEAR          PEAK       ACCUMULATED       PERCENT',
1048           1' OF TIME',/,16X,'  (MW.) ',6X,'VALUE',8X,'EQUALLED OR EXCEEDED',/,
1049           12X,'----',9X,10('-'),2X,13('-'),9X,6('-'),///)
1050      360   FORMAT(//,2X,'50% MID. INTERVAL VALUE=',F12.2,
1051           1//,2X,'98% MID. INTERVAL VALUE=',F12.2)
1052      365   FORMAT('***STATION DURATION AND/OR
1053           1PLOT COMPLETED***')
1054      696   FORMAT(2X,'19',J2,1X,I2,4X,F12.2,2F15.2)
1055      672   FORMAT(15X,2A6,' FLOW DURATION',///,2X,'YEAR/MONTH   DISCHARGE',
1056           1'    ACCUMULATED       PERCENT',' OF TIME',/,17X,'(CFS)',8X,
1057           1'VALUE',8X,'EQUALLED OR EXCEEDED',/,2X,10('-'),3X,9('-'),
1058           14X,11('-'),7X,15('-'),//)
1059      673   FORMAT('***OVERALL FLOW DURATION COMPLETED***')
1060      683   FORMAT('***TOURIST SEASON FLOW DURATION COMPLETED***')
1061      693   FORMAT('***NON-TOUR SEASON FLOW DURATION COMPLETED***')
1062      624   FORMAT(15X,'DURATION LISTING OF',2A6,' OVERALL'
1063           1' ELEVATION (FT.) FOR ',2A6,///,
1064           12X,'YEAR          ELEVATION    ACCUMULATED       PERCENT',
1065           1' OF TIME',/,18X,'(FT.)',9X,'VALUE',7X,
1066           1'EQUALLED OR EXCEEDED',/,2X,'----',10X,9('-'),4X,
1067           111('-'),7X,20('-'),//)
1068      636   FORMAT(15X,2A6,' ELEV. DURATION',///,2X,'YEAR/MONTH.  ELEVATION',
1069           1'    ACCUMULATED       PERCENT',' OF TIME',/,17X,'(FT.)',8X,
1070           1'VALUE',8X,'EQUALLED OR EXCEEDED',/,2X,10('-'),3X,9('-'),
1071           14X,11('-'),7X,15('-'),//)
1072      626   FORMAT('*** MONTHLY ELEVATION DURATION COMPLETED ***')
1073      632   FORMAT('*** OVERALL ELEVATION DURATION COMPLETED ***')
1074      653   FORMAT('*** NAVIGATION DURATION COMPLETED ***')
1075      663   FORMAT('*** NON-NAV. DURATION COMPLETED ***')
1076            END

$MOG  ****** MAPLOAD/ ******

$PRT,S  HST6**NIAG3.MAPLOAD/
```

FURPUR 28R1.M2.6 E35 S7*T11 06/11/81 10:19:55

```
HSTG4*NIAG3(1).MAPLOAD(29)
      @MAP,I ,NIAG3.LOAD
      LIB   SYS$*PLIB$ (IMAIN/$000,DMAIN/$EVEN)
      OPANK,CM  DMAIN,017000
      IN SYS$HYDRO*LIB.GETDAY
      IN NIAG3.LOAD
      IN NIAG3.SUBMONTH
      IN NIAG3.MWL2J2
      IN NIAG3.SUBPEAK
      IN NIAG3.SUBOUR
      IN NIAG3.SUBTOTAL
      IN NIAG3.MWL2W1
      IN NIAG3.SUBSCHEME
      IN NIAG3.ADJUST
      IN NIAG3.SUBPCS
      IN NIAG3.SUBPOND
      IN NIAG3.SUBBHW
      IN NIAG3.SUBCAS
      IN NIAG3.SUBDEC
      IN BLANK$COMMON
      IBANK,M  IMAIN,01000
      FORM   DMAIN
      END

@HDG  ****** SUBDEC/          ******

@PRT,S  HSTG4*NIAG3.SUBDEC/
FURPUR 28R1.H2.6 E35 S74T11 06/11/81 10:19:56
```

-218-

```
HSIG4*NIAG3(1).SUBDEC(35)
      SUBROUTINE QDEC(RLE,MON,DQ)
C     CALCULATION OF DISCHARGE FOR DECEW
C     BASED ON LAKE EPIE ELEVATION AND MONTH AND WELLAND CANAL
C     DIVERSION = 7000 CFS
      DIMENSION C(7),DQMAX(12)
      DATA CO,(C(I),I=1,7)/-0.1262018E+04,0.1575734E+04,-0.8390866E+03,
     10.2454287E+03,-0.4245535E+02,0.4345007E+01,-0.2438443,
     10.5795483E-02/
      DATA (DQMAX(J),J=1,12)/6800.,6800.,6500.,4900.,3700.,
     13800.,3900.,3900.,4000.,3900.,4000.,6100./
      IF(MON.GE.4)GO TO 20
      DQ=(RLE-566.36)/3.111111E-04
      GO TO 30
   20 XLE=(RLE-566.0)/0.505
      DQ=0
      DO 1 I=1,7
    1 DQ=(DQ+C(8-I))*XLE
      DQ=(DQ+CO)*505.0
   30 IF(DQ.GT.DQMAX(MON))DQ=DQMAX(MON)
      IF(DQ.LT.0.0)DQ=0.0
      RETURN
      END

@END
@END IGNORED - IN CONTROL MODE

@FIN
```

****** SUBDEC/ ****** DATE 061181 PAGE 49

RUNID:XLERIE ACCT:AN9320 PROJ:HSTG4 MAX SUPS 00:10:00

SEND OUTPUT TO DENT-HISF3

XLERIG FIN

PRIORITY: P TAPEMOUNTS: 0 MAX SERVOS: 0 ACTUAL SUPS 00:00:44

MAX CORE: 22016 MAX TRACKS: 16 CPU TIME 00:00:00

IMAGES IN: 52 CARDS OUT: 0 PAGES OUT: 50

LAPSED MINS: 0 ARR 10:19 TERM 10:19:57 11JUN81 COST $ .68

```
* * * * * * UNIVAC 1100 TIME/SHARING EXEC --- MULTI-PROCESSOR SYSTEM --- LEV. 1182.V52    SITE * U11-80  * * * * * *
```

```
XX        XX      LL              EEEEEFEEEEEE    RRRRRRRRRR          IIIIII      HH        HH
 XX      XX       LL              EEEFEFEEEEEE    RRRRRRRRRRR         IIIIII      HH        HH
  XX    XX        LL              EE              RR        RR          II        HH        HH
   XX  XX         LL              EE              RR        RR          II        HH        HH
    XXXX          LL              EE              RR        RR          II        HH        HH
     XX           LL              EEEEEFEE        RRRRRRRRRRR           II        HHHHHHHHHHHH
     XX           LL              EEEEEFEE        RRRRRRRRRR            II        HHHHHHHHHHHH
    XXXX          LL              EE              RR    RR              II        HH        HH
   XX  XX         LL              EE              RR     RR             II        HH        HH
  XX    XX        LL              EE              RR      RR            II        HH        HH
 XX      XX       LLLLLLLLLLLL    EEEEEFEEEEEE    RR       RR        IIIIII      HH        HH
XX        XX      LLLLLLLLLLLL    EEEEEFEEEEEE    RR        RR       IIIIII      HH        HH


DDDDDDD    EEEEEEEE  NN     NN  TTTTTTTT          KK    KK              GGGGGGG
DDDDDDDD   EEEEEEEE  NNN    NN  TTTTTTTT          KK   KK              GGGGGGGG
DD     DD  EE        NNNN   NN     TT             KK  KK              GG
DD     DD  EE        NN NN  NN     TT             KK KK               GG
DD     DD  EE        NN  NN NN     TT             KKKK                GG
DD     DD  EEEEE     NN   NNNN     TT             KKK                 GG
DD     DD  EEEEE     NN    NNN     TT             KKK                 GG
DD     DD  EE        NN     NN     TT             KKKK                GG
DD     DD  EE        NN     NN     TT             KK KK               GG     GG
DD     DD  EE        NN     NN     TT             KK  KK              GG     GG
DDDDDDDD   EEEEEEEE  NN     NN     TT             KK   KK              GGGGGGGG
DDDDDDD    EEEEEEEE  NN     NN     TT             KK    KK              GGGGGGG

DENT K G

* * * * * * UNIVAC 1100 TIME/SHARING EXEC --- MULTI-PROCESSOR SYSTEM --- LEV. 1182*V52     SITE * U11-80   * * * * * *


HH     HH    1   5555555  FFFFFFFF  3333333
HH     HH   11   5555555  FFFFFFFF  3333333
HH     HH  111   55       FF            33
HH     HH   11   55       FF           33
HH     HH   11   55       FF          33
HHHHHHHHH   11    55555   FFFFF      33
HHHHHHHHH   11        55  FFFFF       33
HH     HH   11        55  FF           33
HH     HH   11        55  FF            33
HH     HH   11   55   55  FF            33
HH     HH   11    55555   FF       33   33
HH     HH  1111    555    FF       3333333

H15F3

   RUNID * XLERIH        USER ID * GWTP            PART NUMBER * 00      INPUT DEVICE *              OUTPUT DEVICE * PR5

    FILE NAME * PR0000XLERIH            CREATED AT:   16:14:33 MAY 28,1981              PRINTED AT:   16:14:50 MAY 28,1981
```

```
@RUN,P     XLERIE,AN9320/GWTP,HSTG4,10,500
@LOG SEND OUTPUT TO CENT-HISF3
@ASG,A STLPRG.
```

```
@SSG,TME   ,HSTC4*STLPRG./Z
SSG 18K1-H2 73R1H3 05/29/81 16:14:36
```

SSG STREAM GENERATION STATEMENTS

Z	MWLYE1	1, 4
Z	MELYO1	1, 4
Z	SOUWLY-BC	1, 6
Z	M3D1M1	1, 4
Z	MWLYM2	6
Z	MWLYA2	5
Z	MWLYC1	5
Z	MWLYO1	5
Z	MWLYL1	5
Z	MWLYF2	5
Z	MWLYL1	5
Z	M3D1M1	5
Z	MWLYQ1	5
Z	MWLYR1	5
Z	MWLYT1	5
Z	MWLYW1	5
Z	MWLYM2	5
Z	MWLYR1	1, 4
Z	MWLYF2	1, 4
Z	MWLYA2	1, 4
Z	MWLYL1	1, 4
Z	MWLYT1	1, 4
Z	MWLYC1	1, 4
Z	MWLYQ1	1, 4
Z	MAP	1, 1
Z	MWLYM1	1, 4
Z	MAPLOAD	1, 1
Z	MWLYM2	1, 4
Z	XQT	6

```
SSG   REVISED   SKELETON

0001  00    *INCREMENT A FROM 1 BY 1 TO [Z]
0002  01      *IF [Z,A,3,1] <5
0003  02        JHOG  ****** [Z,A,1,1]/[Z,A,2,1] ******
0004  02        #PRT,S  HSTGN*STLPRG.[Z,A,1,1]/[Z,A,2,1]
0005  01      *END
0006  00    *LOOP
```

```
SSG   GENERATED OUTPUT STREAM       PART 1

000001              @HDG  ****** MWLYE1/              ******
000002              @PRT,S  HSTG4*STLPRG.MWLYE1/
000003              @HDG  ****** MWLYD1/              ******
000004              @PRT,S  HSTG4*STLPRG.MWLYD1/
000005              @HDG  ****** SOUWLY-BC/              ******
000006              @PRT,S  HSTG4*STLPRG.SOUWLY-BC/
000007              @HDG  ****** M3D1M1/              ******
000008              @PRT,S  HSTG4*STLPRG.M3D1M1/
000009              @HDG  ****** MWLYR1/              ******
000010              @PRT,S  HSTG4*STLPRG.MWLYR1/
000011              @HDG  ****** MWLYF2/              ******
000012              @PRT,S  HSTG4*STLPRG.MWLYF2/
000013              @HDG  ****** MWLYA2/              ******
000014              @PRT,S  HSTG4*STLPRG.MWLYA2/
000015              @HDG  ****** MWLYL1/              ******
000016              @PRT,S  HSTG4*STLPRG.MWLYL1/
000017              @HDG  ****** MWLYT1/              ******
000018              @PRT,S  HSTG4*STLPRG.MWLYT1/
000019              @HDG  ****** MWLYC1/              ******
000020              @PRT,S  HSTG4*STLPRG.MWLYC1/
000021              @HDG  ****** MWLYO1/              ******
000022              @PRT,S  HSTG4*STLPRG.MWLYO1/
000023              @HDG  ****** MAP/              ******
000024              @PRT,S  HSTG4*STLPRG.MAP/
000025              @HDG  ****** MWLYW1/              ******
000026              @PRT,S  HSTG4*STLPRG.MWLYW1/
000027              @HDG  ****** MAPLOAD/              ******
000028              @PRT,S  HSTG4*STLPRG.MAPLOAD/
000029              @HDG  ****** MWLYM2/              ******
000030              @PRT,S  HSTG4*STLPRG.MWLYM2/

END SSG      TIME =  00:00:01  HIGHEST ADDRESS =  0061552  OCTAL

@HDG  ****** MWLYE1/              ******

@PRT,S  HSTG4*STLPRG.MWLYE1/
FURPUR 28R1.M2.6 E35 S74T11 05/28/81 16:14:37
```

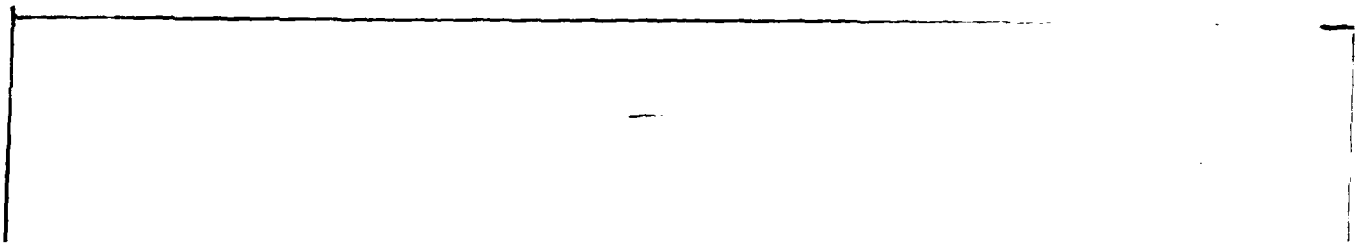
```
HST64*STLPRG(1).NWLYR1(4)
      1          SUBROUTINE DURR(TITLE,TITLE1,B,M,INDEX,NUM)                    WLWE0010
      2          PARAMETER LYRS = 130                                           @NS7407
      3     C                                                                   WLWE0020
      4     C            THIS SUBROUTINE PRODUCES A DURATION REPORT CONTAINING  WLWE0030
      5     C                    -DATE                                          WLWE0040
      6     C                    -VALUE                                         WLWE0050
      7     C                    -ACCUMULATED TOTAL                             WLWE0060
      8     C                    -PERCENTAGE                                    WLWE0070
      9     C                    -AVERAGE VALUE                                 WLWE0080
     10     C                                                                   WLWE0090
     11     C            INPUT- TITLE - 7 WORD TITLE AT TOP OF EACH PAGE        WLWE0100
     12     C                 - TITLE1- 3 WORD SUBTITLE APPENDED TO TITLE       WLWE0110
     13     C                 - B(2,LYRS) - ARRAY OF REAL VALUES AND DATES
     14     C                 - M(2,LYRS) - ARRAY OF INTEGER VALUES AND DATES
     15     C                 - INDEX - NUMBER OF VALUES IN B OR M              WLWE0140
     16     C                 - NUM = 1 IF INPUT IS REAL
     17     C                                                                   WLWE0160
     18          DIMENSION B(2,LYRS), M(2,LYRS), TITLE(7), TITLE1(3)           @NS7407
     19          COMMON/COM3/INDG(4)                                           WLWE0175
     20          COMMON/COM4/ MNMYRD(LYRS), NUMYRM(LYRS)                       @NS7407
     21          COMMON /COMS/IYEAR1
     22     C                                                                   WLWE0180
     23     C            SET INITIAL VALUES                                     WLWE0190
     24     C                                                                   WLWE0200
     25          LINE=60                                                       WLWE0210
     26          SUM=0.                                                        WLWE0230
     27          ISUM=0                                                        WLWE0240
     28          ISUMD = 0
     29          ISUMM = 0
     30          IFIRST = IYEAR1+1
     31          ILAST = IYEAR1+INDEX
     32     C                                                                   WLWE0250
     33     C            SORT VALUES IN M(2,INDEX) IN DESCENDING ORDER          WLWE0260
     34     C                                                                   WLWE0270
     35          INDI=INDEX-1                                                  WLWE0280
     36          DO 9 I=1,INDI                                                 WLWE0290
     37          INDJ=I+1                                                      WLWE0300
     38          DO 8 J=INDJ,INDEX                                             WLWE0310
     39          IF (M(1,I)-M(1,J))6,7,6                                       WLWE0320
     40        7 IF (M(2,I).LE.M(2,J))GO TO 8                                  WLWE0325
     41        6 M1=M(1,I)                                                     WLWE0330
     42          M2=M(2,I)                                                     WLWE0340
     43          M(1,I)=M(1,J)                                                 WLWE0350
     44          M(2,I)=M(2,J)                                                 WLWE0360
     45          M(1,J)=M1                                                     WLWE0370
     46          M(2,J)=M2                                                     WLWE0380
     47        8 CONTINUE                                                      WLWE0390
     48        9 CONTINUE                                                      WLWE0400
     49          DO 10 I=1,INDEX                                               WLWE0410
     50     C                                                                   WLWE0420
     51     C            CALCULATE ACCUMULATED TOTAL AND PERCENTAGE AND WRITE LINEWLWE0430
     52     C            OF OUTPUT                                              WLWE0440
     53     C                                                                   WLWE0450
     54          LINE=LINE+1                                                   WLWE0460
     55          IF (LINE.LE.53)GO TO 5                                        WLWE 470
     56     C                                                                   WLWE0480
```

```
C                COMMENCE A NEW PAGE -WRITE TITLES                      WLWE0490
C                                                                       WLWE0500
      LINE = 8
      WRITE(6,200) IHDG,IFIRST,ILAST
  200 FORMAT (1H1,34X,61HEVALUATION OF REGULATIONS FOR GREAT LAKES LEVELWLWE0540
     1S AND OUTFLOWS,16X,4A4 /,50X,31H SAUNDERS OR MOSES PLANT OUTPUT
     2 31X,I4,1H-,I4/)
      WRITE (6,201)(TITLE(J),J=1,7),(TITLE1(J),J=1,3)                   WLWE0560
  201 FORMAT (38X,21HDURATION LISTING FOR ,10A4/)
      IF(NUM.NE.10) WRITE(6,202)
  202 FORMAT (23X,4HYEAR,20X,5HVALUE,15X,17HACCUMULATED VALUE,11X,10HPERWLWE0590
     1CENTAGE/)                                                         WLWE0600
      IF(NUM.EQ.10) WRITE(6,106)
    5 X=I                                                               WLWE0610
      Y=INDEX                                                           WLWE0620
      PERC=(2.*X-1.)/Y*50.                                              WLWE0630
      IF(NUM.EQ.10) GO TO 20
      IF(NUM.GE.3) GO TO 2
C                                                                       WLWE0650
C                INPUT VALUES ARE REAL                                  WLWE0660
C                                                                       WLWE0670
    1 SUM=SUM+B(1,I)                                                    WLWE0680
      WRITE (6,101)M(2,I),B(1,I),SUM,PERC                               WLWE0690
  101 FORMAT (23X,I4,17X,F8.2,18X,F9.2,17X,F6.2)                        WLWE0700
      GO TO 10                                                          WLWE0710
C                INPUT VALUES ARE INTEGER                               WLWE0720
C                                                                       WLWE0730
C                                                                       WLWE0740
    2 ISUM=ISUM+M(1,I)                                                  WLWE0750
      WRITE (6,102)M(2,I),M(1,I),ISUM,PERC                              WLWE0760
  102 FORMAT (23X,I4,17X,I8,17X,I10,17X,F6.2)                           WLWE0770
      GO TO 10
   20 IND = M(2,I) - IYEAR1
      ISUM = ISUM + M(1,I)
      ISUMD = ISUMD + MWHYRD(IND)
      ISUMN = ISUMN + MWHYRN(IND)
      WRITE(6,105) M(2,I),MWHYRD(IND),ISUMD,MWHYRN(IND),ISUMN,M(1,I),
     1ISUM,PERC
  105 FORMAT (11X,I4,4X, 3(I10,5X,I12,7X),F6.2)
  106 FORMAT (29X,7HDAYTIME,25X,9HNIGHTTIME,28X,5HTOTAL,/  11X,4HYEAR,
     1 3(4X,30HENERGY(MWH)  ACCUMULATED VALUE),2X,10HPERCENTAGE)
   10 CONTINUE                                                          WLWE0780
C                                                                       WLWE0790
C                WRITE AVERAGE VALUE AT END OF REPORT                   WLWE0800
C                                                                       WLWE0810
      IF(NUM.EQ.10) GO TO 21
      IF(NUM.GE.3) GO TO 4
    3 SIND=INDEX                                                        WLWE0830
      SUM=SUM/SIND                                                      WLWE0840
      WRITE (6,103)SUM                                                  WLWE0850
  103 FORMAT (1H+,105X,15HAVERAGE VALUE  ,F8.2)                         WLWE0860
      RETURN                                                            WLWE0870
    4 ISUM=(ISUM+INDEX/2)/INDEX                                         WLWE0880
      WRITE (6,104)ISUM                                                 WLWE0890
  104 FORMAT (1H+,105X,14HAVERAGE VALUE ,I9)                            WLWE0900
      RETURN                                                            WLWE0910
   21 ISUMD = (ISUMD+INDEX/2)/INDEX
```

```
      ISUMN = (ISUMN+INDEX/2)/INDEX
      ISUM  = (ISUM +INDEX/2)/INDEX
      WRITE(6,107) ISUMO , ISUMN , ISUM
  107 FORMAT (/4X, 13HAVERAGE VALUE,2X,3(I10,24X))
      RETURN
      END                                                    WLWF0920
```

```
@HDG  ****** MWLYD1/          ******

@PRT,S  HSIG4*STLPRG.MWLYD1/
FURPUR 28R1.H2.6 E35 S74711 05/28/81 16:14:38
```

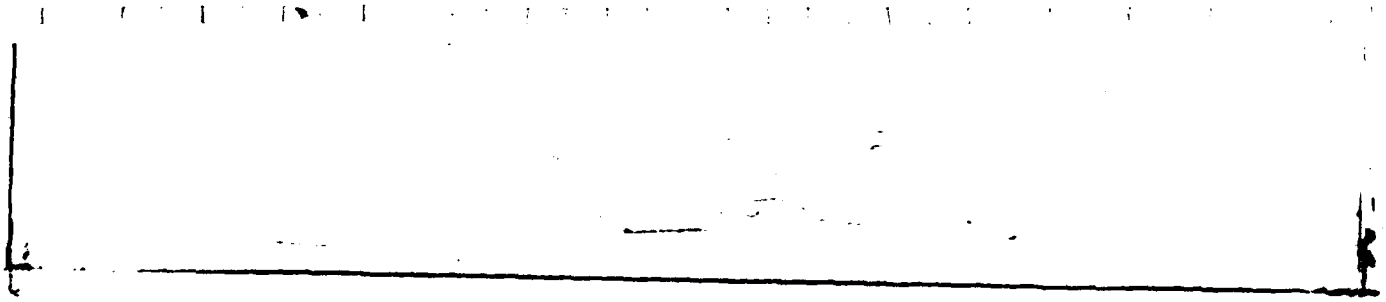
```
HSTG4*STLPRG(1).MWLYD1(4)
      SUBROUTINE DURAT (IYEAR1,INDEX)                                   LWD10010
      PARAMETER    LYRS = 130                                           @NS7407
C                                                                       LWD10020
C             THE SUBROUTINE PRODUCES THE DURATION CURVES               LWD10030
C                  (1) FOR EACH MONTH FOR                               LWD10040
C                          - LAKE ONTARIO LEVEL    A(14,LYRS,1)         @NS7407
C                          - LAKE ONTARIO FLOW     A(14,LYRS,2)         @NS7407
C                          - DAYTIME OUTPUT        A(14,LYRS,3)         @NS7407
C                          - NIGHTTIME OUTPUT      A(14,LYRS,4)         @NS7407
C                          - PEAK OUTPUT           A(14,LYRS,5)         @NS7407
C                  (2) FOR TOTAL ANNUAL ENERGY
C                                                                       LWD10100
C             INPUT :  IYEAR1 - THE BEGINNING YEAR                      LWD10110
C                      INDEX - THE NUMBER OF YEARS                      LWD10120
C                                                                       LWD10130
C             SUBROUTINE  USED :                                        LWD10140
C                      DURC(TITLE,TITLE1,B,M,INDEX,NUM)                 LWD10150
C                                                                       LWD10160
      COMMON/COM1/ A(14,LYRS,7)                                         @NS7407
      COMMON/COM4/ MWHYRD(LYRS), MWHYRN(LYRS)                           @NS7407
      COMMON/COM6/ IA(14,LYRS,2)                                        @NS7407
      DIMENSION B(2,LYRS), TITLE(7,7), TITLE1(3,14), TITLE2(7),         @NS7407
     *       TITLE3(3), M(2,LYRS), MWHYRT(LYRS)                         @NS7407
      EQUIVALENCE (B(1),M(1))                                           LWD10200
      DATA TITLE/4H LAK,4HE ON,4HT LE,4HVELS,4H (FT,4H)  F,2HOR,
     *4HHEAD,4H WAT,4HER L,4HEVEL,4HS (F,4HT) F,2HOR,4HLAKE,4H ONT,
     *4H OUT,4HFLOW,4HS(CF,4HS) F,2HOR,
     2           4HDAYT,4HIME ,4HENER,4HGY ( ,4HMW) ,4H   F,2HOR,
     3            4HNIGH,4HTTIM,4HE EN,4HERGY,4H (MW,4H)  F,2HOR,
     4            4HPEAK,4H PLA,4HNT O,4HUTPU,4HT (M,4HW) F,2HOR,
     5            4HAVER,4HAGE ,4HMONT,4HHLY ,4HENER,4HGY F,2HOR/
      DATA TITLE2/4HTOTA,4HL PL,4HANT ,4HMWH ,4HOUTP,4HUT F,2HOR/
     1     TITLE3/4HWHOL,4HE YE,2HAR/
     2                    TITLE1/4HJANU,3HARY,1H ,4HFEBR,4HUARY,1H ,4HM
     3ARC,1HH,1H ,4HAPR ,4H01-1,1H5,3HAPR,4H16-3,1H0,3HMAY,1H ,1H ,4HJUNLWD10240
     4E,1H ,1H ,4HJULY,1H ,1H ,4HAUGU,2HST,1H ,4HSEPT,4HEMBE,1HP,4HOCTO,LWD10250
     53HBER,1H ,4HNOVE,4HMBER,1H ,4HDEC ,4H01-1,1H5,4HDEC ,4H16-3,1H1/  LWD10260
      DATA MWHYRD/LYRS*0/MWHYRN/LYRS*0/                                 @NS7407
C                                                                       LWD10310
C             PROGRAM BEGINS                                            LWD10320
C                                                                       LWD10330
      IYEAR1=IYEAR1-1                                                   LWD10340
      DO 11 K = 1,7
C                                                                       LWD10400
C             PRODUCE DURATION CURVES FOR EACH MONTH
C                                                                       LWD10431
      DO 16 I=1,14                                                      LWD10432
C                                                                       LWD10434
C             PRODUCE DURATION CURVES FOR ONE  MONTH                    LWD10436
C                                                                       LWD10438
C                                                                       LWD10440
C             MOVE DATA AND YEARS TO ARRAY B                            LWD10450
C                                                                       LWD10460
      DO 10 J=1,INDEX                                                   LWD10470
      B(1,J)=A(I,J,K)                                                   LWD10480
   10 M(2,J)=IYEAR1+J                                                   LWD10490
```




```
      C                                                                 LWD10500
      C              CALL SUBROUTINE TO PRODUCE DURATION CURVE          LWD10510
      C                                                                 LWD10520
   16 CALL DURC(TITLE(1,K),TITLE1(1,1),B,M,INDEX,K)                     LWD10530
   11 CONTINUE                                                          LWD10531
      DO 30 I=1,INDEX
      DO 25 J=1,14
      MWHYRD(I) = MWHYRD(I) + IA(J,I,1)
      MWHYRN(I) = MWHYRN(I) + IA(J,I,2)
   25 CONTINUE
      MWHYRT(I) = MWHYRD(I) + MWHYRN(I)
   30 CONTINUE
      DO 40 J=1,INDEX
      IYEAR = IYEAR1 + J
      M(1,J) = MWHYRT(J)
   40 M(2,J) = IYEAR
      CALL DURC(TITLE2,TITLE3,B,M,INDEX,10)
      RETURN
      END
```

@HDG ****** SOUWLY-BC/ ******

```
@PRT,S  HSTG4*STLPRG.SOUWLY-BC/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 16:14:38
```

****** SOUNLY-RC/ ****** DATE 052881 PAGE 11

ISTG4*STLPRG(1).SOUNLY-RC(0)
1 IN .M*LYM2

;HDG ****** M3D1M1/ ******

;PRT,S HSTG4*STLPRG.M3D1M1/
FURPUR 28R1.M2.6 E3S S74T11 05/28/81 16:14:39

```
HSTG4*STLPRG(1).M3D1M1(1)
      C
            FUNCTION LEAP(IYEAR)                                          30100010
      C (UNIVAC 1108 - FORTRAN V)                                         30100015
      C
      C FUNCTION LEAP EXAMINES THE INPUT YEAR TO DETERMINE WHETHER IT IS A  30100020
      C LEAP YEAR. WHEN THE INPUT YEAR IS A LEAP YEAR A FLAG IS SET TO 1. IF 30100030
      C IT IS NOT A LEAP YEAR THIS FLAG IS SET TO 0.                      30100040
      C
            ALPHA = IYEAR                                                 30100050
            BETA = ALPHA / 4.0                                            30100060
            LAMBDA = IYEAR / 4                                            30100070
            GAMMA = LAMBDA                                                30100080
      C
            IF (BETA.EQ.GAMMA) GO TO 200                                  30100090
      C
        100 LEAP = 0                                                      30100100
            GO TO 400                                                     30100110
      C
        200 IF (IYEAR.EQ.1900) GO TO 100                                  30100120
      C
        300 LEAP = 1                                                      30100130
      C
        400 RETURN                                                        30100140
      C
            END                                                           30100150
```

```
@HDG  ****** MWLYR1/          ******

@PRT,S  HSTG4*STLPRG.MWLYR1/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 16:14:39
```

```
HSTG4*STLPRG(1).MWLYR1(5)
      FUNCTION IROUND(X)                                          WLWR1010
C     FUNCTION TO ROUND ANY NO. X TO FIRST DIGIT
      M= X                                                        WLWR1020
      Y=M                                                         WLWR1030
      Z=  X-Y                                                     WLWR1040
      IF(Z.GT.0.5) GO TO 20                                       @NS7407
      IF(Z.LT.0.5) GO TO 30                                       @NS7407
      L = M/2                                                     @NS7407
      J = L*2                                                     @NS7407
      IF(J.EQ.M) GO TO 30                                         @NS7407
   20 M = M + 1                                                   @NS7407
   30 IROUND = M                                                  @NS7407
      RETURN                                                      WLWR1160
      END                                                         WLWR1170
```

@HDG ****** MWLYF2/ ******

@PRT,S HSTG4*STLPRG.MWLYF2/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 16:14:40

```
HSTG4*STLPRG(1).MWLYF2(6)
      1          REAL FUNCTION FOREBY(ONTL,FLOW)                          WLWF1010
      2      C   FUNCTION TO CALCULATE FOREBAY ELEVATION FOR A
      3      C   GIVEN LAKE LEVEL AND OUTFLOW
      4          COMMON/COM2/DUMMY(3),JMONTH                              WLWF1020
      5          INTEGER FLOW                                             WLWF1025
      6          DIMENSION X(11,3)
      7          DATA X(1,1),X(1,2),X(1,3)/-.2428614E4,.2035088TE2,-.38573212E-1/,
      8         *     X(2,1),X(2,2),X(2,3)/-.3105396DE4,.2583592E2,-.49561553E-1/,
      9         *     X(3,1),X(3,2),X(3,3)/-.4140725DE4,.3421789AE2,-.6665A119E-1/,
     10         *     X(4,1),X(4,2),X(4,3)/-.52668722E4,.4412032E2,-.8470746ZE-1/,
     11         *     X(5,1),X(5,2),X(5,3)/-.69967926E4,.5736593QE2,-.1135852JEO/,
     12         *     X(6,1),X(6,2),X(6,3)/-.7176983JE4,.5969698AE2,-.1159938IEO/,
     13         *     X(7,1),X(7,2),X(7,3)/-.9747107JE4,.7953589E2,-.1582781TEO/,
     14         *     X(8,1),X(8,2),X(8,3)/-.1157024FE5,.9420185BE2,-.1877853EO/,
     15         *     X(9,1),X(9,2),X(9,3)/-.1417218FE5,.1151902SF3,-.2301159IEO/,
     16         *     X(10,1),X(10,2),X(10,3)/-.1345543GE5,.1090391SE3,-.2169696IEO
     17         */,X(11,1),X(11,2),X(11,3)/-.1479775TE5,.1197309BE3,-.2382654EO/
     18      C
     19          IF(JMONTH.LT.4)GO TO 10                                  WLWF1050
     20          FOREBY=APPROX(ONTL,FLOW)
     21          IF(FOREBY.GT.242.00)GO TO 20                             WLWF1061
     22          IF(FOREBY .GE. 230.00) RETURN
     23          IF(FOREBY.GT.0.0 .OR. FOREBY.LT.0.0) GO TO 7             ANS7407
     24          GO TO 6                                                  ANS7407
     25        7 WRITE(6,9)FOREBY
     26        9 FORMAT(10X,'FOREBAY ELEVATION IS',F8.2,' - TOO LOW. NO RESULTS FOR
     27         * THIS MONTH.')
     28          FOREBY=0
     29          CALL LINECT
     30          RETURN
     31      C
     32        6 WRITE(6,5)
     33        5 FORMAT(10X,'FOREBAY ELEVATION CALCULATION DOES NOT CONVERGE. NO RE
     34         *SULTS FOR THIS MONTH.')
     35          CALL LINECT
     36          RETURN
     37      C
     38       10 IFL = (FLOW/10000) * 10000                               WLWF1062
     39          IFL1 = IFL                                               WLWF1067
     40          IF(IFL.LT. 260000) GO TO 14                              WLWF1063
     41          WRITE(6,12)                                              WLWF1064
     42          CALL LINECT                                              WLWF1064
     43       12 FORMAT(10X,     '*HFLOW IS NOT BETWEEN 180000 AND 280000 CFS.  EXTWLWF1065
     44         *RAPOLATION IS NECESSARY TO OBTAIN FOREBAY ELEVATION.')   WLWF1065
     45          IFL1 = 270000                                            WLWF1066
     46       14 IF(IFL.GE. 180000)GO TO 16                               WLWF1067
     47          IFL1 = 180000                                            WLWF1068
     48          WRITE(6,12)                                              WLWF1069
     49          CALL LINECT                                              WLWF1070
     50       16 IFL2 = IFL1 + 10000                                      WLWF1071
     51          I = IFL1/10000 - 17                                      WLWF1072
     52          J = IFL2/10000 - 17                                      WLWF1073
     53          Y1 = X(I,1) + X(I,2)*ONTL + X(I,3)*ONTL**2               WLWF1074
     54          Y2 = X(J,1) + X(J,2)*ONTL + X(J,3)*ONTL**2               WLWF1075
     55          FOREBY = Y1 + ((Y2-Y1)/10000.)*(FLOW-IFL1)               WLWF1078
     56          IF( FOREBY .LT. 230.00 ) GO TO 7
```

```
      IF(FOREBY.LE.242.00) RETURN                                       WLWF1081
   20 WRITE(6,30) FOREBY                                                WLWF1082
   30 FORMAT(10X,19HFOREBY ELEVATION IS,F8.2,45H -TOO HIGH. IT HAS BEEN WLWF1083
     *CHANGED TO 242.00 FT.)                                            WLWF1084
      CALL LINECT                                                       WLWF1085
      FOREBY = 242.00                                                   WLWF1089
      RETURN                                                            WLWF1090
      END                                                               WLWF1100
```

@HDG ****** MWLYA2/ ******

@PRT,S HSTG4*STLPRG.MWLYA2/
FURFUR 28R1.H2.6 E35 S74T11 05/28/81 16:14:41

```
HSTG4*STLPRG(1).MWLYA2(4)
      C
            REAL FUNCTION APPROX(ONTL,FLOW)
      C
      C     CALCULATION OF FOREBAY ELEVATION UNDER OPEN WATER CONDITIONS
      C     USING NEWTON-RAPHSON METHOD.
            INTEGER FLOW
      C
            REAL*8 X,FX,FXP,T
            R=FLOW
            FORE=1.75*(ONTL - R/40000) - 176.75
            C1=ONTL-903.228
            C2=(451.614**2 - ONTL**2)
            C3=ONTL * (ONTL * (903.228-ONTL) - (451.614)**2)
           1  +(.00027304*FLOW)**2
      C
            X=FORE
            K=0
          1 FX=X**3 + C1*X**2 + C2*X + C3
            FXP=3*X**2 + 2*C1*X + C2
      C
          2 IF(K .GT. 0)GO TO 3
            J=K
            K=1
            NMAX=50
            N=0
          3 T=FX
            IF(ABS(T) .LE. .5)GO TO 5
          4 IF(N .EQ. NMAX)GO TO 6
            IF(.NOT. ABS(FXP) .GT. 0)GO TO 8
            T=X
            IF(T.LE.200.)GO TO 6
            X=X-FX/FXP
            N=N+1
            CALL OVERFL(I)
            IF(I .EQ. 1)GO TO 9
            IF(.NOT. ABS(T-X) .GT. 0)GO TO 7
            GO TO 10
          5 K=2
            GO TO 10
          6 K=3
            GO TO 10
          7 K=4
            GO TO 10
          8 K=5
            GO TO 10
          9 K=6
      C
         10 IF(K .EQ. 1)GO TO 1
            APPROX=X
            IF(K .EQ. 3)APPROX=0.0
      C
            RETURN
      C
            END
```

@HDG ****** MWLYL1/ ******

@PRT,S HSTG4*STLPRG.MWLYL1/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 16:14:41

```
HSTG4*STLPRG(1).MWLYL1(4)
      SUBROUTINE LINECT                                                 WLWL0010
C     LINE ACCUMMUATION, PAGING AND TITLING
      COMMON LINE                                                       WLWL0012
      COMMON /CCM3/IHDG(4)                                              WLWL0015
      IF(LINE.LT.47) GO TO 1
      WRITE(6,100) IHDG                                                 WLWL0040
      LINE=0                                                            WLWL0050
    1 LINE=LINE+1                                                       WLWL0060
      RETURN                                                            WLWL0070
  100 FORMAT(1H1,36X,61HEVALUATION OF REGULATIONS FOR GREAT LAKES LEVELSWLWL0080
     * AND OUTFLOWS,16X,4A4 /,46X,31H SAUNDERS OR MOSES PLANT OUTPUT,   WLWL0090
     * //16X,'LAKE ONTARIO',5X,'HW',5X,'LAKE ONTARIO',8X,'DAYTIME ENERGY
     *',8X,'NIGHTTIME ENERGY',10X,'PEAK',5X,'MONTHLY'/4X,'DATE',13X,
     * 'LEVEL',8X,'ELEV',7X,'OUTFLOW',7X,2('AVG. OUTPUT    ENERGY  '),
     * 4X,'OUTPUT',4X,'AVERAGE'/21X'(FT)',9X,'(FT)',8X,'(CFS)',11X,2('(M
     *W)',8X,'(MWH)',6X),
     *6H  (MW),7X,4H(MW)/)
      END                                                               WLWL0140
```

```
@HDG  ****** MWLYT1/          ******

@PR1,S  HSTG4*STLPRG.MWLYT1/
FURPUR 26R1.H2.6 E35 S74T11 05/28/81 16:14:42
```

-240-

```
****** MWLYTI/              ******                                                    DATE 052881        PAGE    19

HSTG4*STLPRG(1).MWLYTI(4)
                REAL FUNCTION  TAILW(PLANT)                                      WLWT1010
        C       CALCULATION OF TAILWATER ELEVATION FOR A GIVEN FLOW
                COMMON/COM2/DUMMY(3),JMONTH                                      WLWT1020
                IF(JMONTH.LT.4)GO TO 10                                          WLWT1030
                TAILW = 0.14814668E 03 + 0.42526491E-04*PLANT - 0.25073493E-10*  WLWT1040
               *  (PLANT**2)                                                    WLWT1045
                RETURN                                                           WLWT1050
        C
             10 TAILW = 0.14889419E 03+0.43055756E-04*PLANT - 0.25341969E-10 *   WLWT1070
               *  (PLANT**2)                                                    WLWT1080
                RETURN                                                           WLWT1090
                END                                                              WLWT1100

@HDG  ****** MWLYC1/              ******

@PRT,S  HSTG4*STLPRG.MWLYC1/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 16:14:43
```

```
HSTG4*STLPRG(1).MWLYC1(13)
      SUBROUTINE CARDPD(INDEX)                                          WLWC1010
C     READS AND STORES INPUT
      INTEGER FLOW,OUTPUT                                               WLWC1015
      PARAMETER LYRS = 130, MAXYR = 1989                                &NS7407
      COMMON/COM1/ ONTL(14,LYRS),DUMN(14,LYRS),FLOW(14,LYRS),           &NS7407
     *       FORE(14,LYRS),TAIL(14,LYRS),PLANT(14,LYRS),OUTPUT(14,LYRS) &NS7407
     *      /COM2/IYEAR,JYEAR,IMONTH,JMONTH                             WLWC1040
C
      COMMON /ADJUST/ALEVEL, AFLOW
      REAL      LEVEL(7),OUTFL(7)                                       WLWC1050
    1 READ(5,2)IYEAR,IMONTH,(LEVEL(I),OUTFL(I),I=1,7)                   WLWC1060
    2 FORMAT(I4,I2,4X,7(F5.2,F5.0))                                     WLWC1060
      IF(INDEX.NE.1)GO TO 5                                             WLWC1100
      JYEAR = IYEAR                                                     WLWC1110
      JMONTH = IMONTH                                                   WLWC1120
    5 IF(IYEAR.EQ.9999)RETURN                                           WLWC1130
      IF(IYEAR.LE.MAXYR) GO TO 7                                        &NS7407
      WRITE(6,6) IYEAR                                                  WLWC1150
      CALL LINECT                                                       WLWC1155
    6 FORMAT( 9X, 8H YEAR IS,I5,23H, CARD IS BEING IGNORED)             WLWC1160
      GO TO 1                                                           WLWC1170
    7 IF(IYEAR.LE.JYEAR)GO TO  15                                       WLWC1180
      WRITE(6,9)JYEAR, IYEAR                                            WLWC1190
      CALL LINECT                                                       WLWC1195
    9 FORMAT( 9X,29H WRONG YEAR, YEAR EXPECTED IS,I5,15H, YEAR FOUND IS,WLWC1200
     * I5,39H, ZEROS ARE INSERTED FOR MISSING VALUES)                   WLWC1210
      K = INDEX                                                         WLWC1220
      INDEX = INDEX + IYEAR - JYEAR                                     WLWC1230
      L = INDEX -1                                                      WLWC1240
      IL = JMONTH -1                                                    WLWC1250
      DO 12 I =K,L                                                      WLWC1260
   10 IL=IL+1                                                           WLWC1270
      IF(IL.GT.14)GO TO  11                                             WLWC1280
      ONTL(IL,I)= 0.                                                    WLWC1290
      FLOW(IL,I)= 0.                                                    WLWC1300
      FORE(IL,I)= 0.                                                    WLWC1310
      TAIL(IL,I)= 0.                                                    WLWC1320
      PLANT(IL,I)= 0.                                                   WLWC1330
      OUTPUT(IL,I)=0.                                                   WLWC1340
      DUMN(IL,I) = 0.
      GO TO 10                                                          WLWC1350
   11 IL=0                                                              WLWC1360
   12 CONTINUE                                                          WLWC1370
      JMONTH = 1                                                        WLWC1380
      JYEAR = IYEAR                                                     WLWC1390
      GO TO 20                                                          WLWC1400
   15 IF(IYEAR.EQ.JYEAR)GO TO 20                                        WLWC1410
      WRITE(6,18)JYEAR, IYEAR                                           WLWC1420
      CALL LINECT                                                       WLWC1425
   18 FORMAT( 9X,29H WRONG YEAR, YEAR EXPECTED IS,I5,15H, YEAR FOUND IS,WLWC1430
     * I5,17H, CARD IS IGNORED)                                         WLWC1440
      GO TO 1                                                           WLWC1450
   20 IF(IMONTH.EQ.JMONTH)GO TO 30                                      WLWC1460
      IF(JMONTH.EQ.1)GO TO 25                                           WLWC1470
      WRITE(6,22)IYEAR                                                  WLWC1480
      CALL LINECT                                                       WLWC1485
```

```
      22 FORMAT(10X,50H DUPLICATE CARD ENCOUNTERED FOR FIRST HALF OF YEAR, WLWC1490
     * I5,14H, CARD IGNORED)                                              WLWC1500
        GO TO 1                                                          WLWC1510
C
      25 WRITE(6,27) IYEAR                                               WLWC1520
        CALL LINECT                                                      WLWC1525
      27 FORMAT( 9X,20H FIRST CARD FOR YEAR,I5,50H IS MISSING, ZEROS ARE INWLWC1530
     *SERTED FOR MISSING VALUES)                                         WLWC1540
        JMONTH=5                                                         WLWC1545
        I=0                                                              WLWC1550
      29 I = I + 1                                                       WLWC1560
        IF(I.GT.7)GO TO 30                                               WLWC1570
        ONTL(I,INDEX) = 0.                                               WLWC1580
        FLOW(I,INDEX) = 0.                                               WLWC1590
        FORE(I,INDEX)=0.                                                 WLWC1595
        TAIL(I,INDEX) = 0.                                               WLWC1600
        PLANT(I,INDEX)= 0.                                               WLWC1610
        OUTPUT(I,INDEX)=0.                                               WLWC1620
        GO TO 29                                                         WLWC1630
C
      30 I = 1                                                           WLWC1640
      40 ONTL(JMONTH,INDEX) = LEVEL(I) * ALEVEL                                WLWC1650
        FLOW(JMONTH,INDEX) = OUTFL(I)* 10.0 * AFLOW                            WLWC1660
        I=I + 1                                                          WLWC1670
        JMONTH = JMONTH +1                                               WLWC1680
        IF(I.LE.7)GO TO 40                                               WLWC1690
        JMONTH = JMONTH -7                                               WLWC1700
        RETURN                                                           WLWC1710
        END                                                              WLWC1720
```

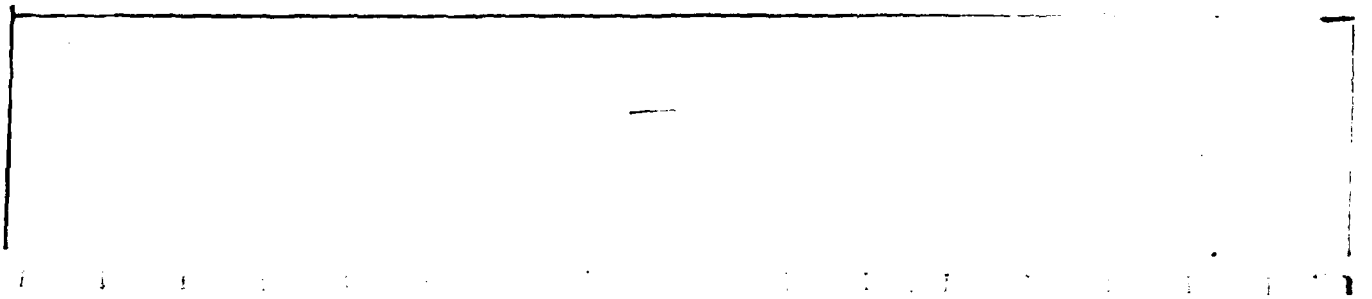


```
@HDR  ****** MWLYQ1/ ******

@PRT,S  HSTG**STLPRG.MWLYQ1/
FURPUR 28R1.M2.6 E35 $74T11 05/28/81 16:14:43
```

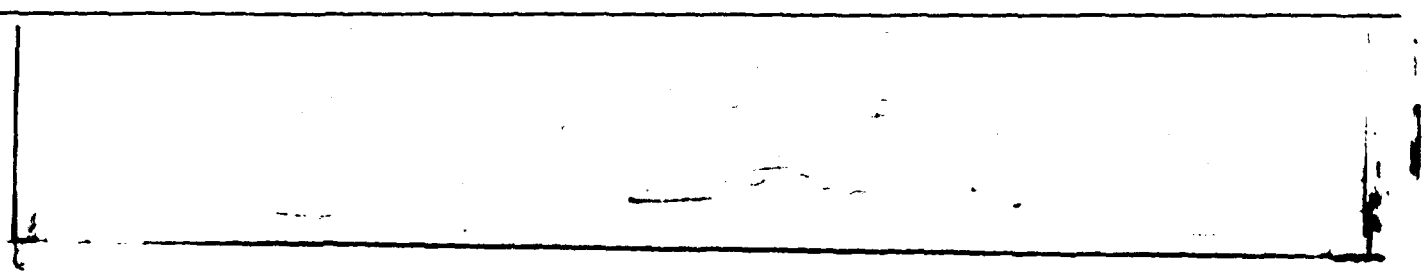
```
HSTG4*STLPRG(1).MWLYQ1(5)
      PEAL    FUNCTION OUT(HEAD,PLANT)                                  WLWQ1001
C     CALCULATES PLANT OUTPUT
      DATA X1,X2,X3/-.22710024E04, .23514604E-01,-.32738665E-07 /       WLWQ1015
      DATA X4,X5,X6/-.20992905E04, .21559394E-01,-.30775518E-07 /       WLWQ1016
      X = 282590. +(HEAD-88.)* 3930./14.                                WLWQ1020
      IF(PLANT.LE.X)GO TO 2                                             WLWQ1030
      Y1  =  X4 + X5 * PLANT + X6 * PLANT**2                            WLWQ1040
      Y2  =  X1 + X2 * PLANT + X3 * PLANT**2                            WLWQ1045
      OUT = Y1 + ((Y2-Y1)/10.)*(HEAD-74.0)                              WLWQ1050
      OUT = AMIN0 ( OUT , 1847.7 + 28.219429 * (HEAD-81.0) )            JUL 1978
      RETURN                                                            WLWQ1055
C
    2 IF(HEAD.GE.81.)ECONF =6.0 +(HEAD-81.0)*.533/7.0                   WLWQ1060
      IF(HEAD.LT.81.)ECONF =5.448 +(HEAD-74.)*.552/7.0                  WLWQ1070
C
      OUT = ECONF * PLANT/1000.                                         WLWQ1080
      RETURN                                                            WLWQ1090
      END                                                               WLWQ1100
```

```
@HDG  ****** MAP/          ******

@PRT,S  HSTG4*STLPRG.MAP/
FURPUR 2891.H2.6 E35 S74T11 05/28/81 16:14:44
```

-244-



```
****** MAP/              ******                                                    DATE 052881        PAGE    23

HSTG4*STLPRG(1).MAP(2)
      @MSG,N MAP RUNSTREAM STATEMENTS
      IN STLPRG.MWLYE1
      IN STLPRG.MWLYR1
      IN STLPRG.MWLYD1
      IN STLPRG.MWLYW1
      IN STLPRG.MWLYF2
      IN STLPRG.MWLYA2
      IN STLPRG.MWLYL1
      IN STLPRG.MWLYT1
      IN STLPRG.MWLYC1
      IN STLPRG.MWLYM2
      IN STLPRG.MWLYQ1
      IN STLPRG.M301M1
      END

@HDG  ****** MWLYW1/              ******

@PR1,S  HSTG4*STLPRG,MWLYW1/
FURFUR 28R1.H2.6 E35 S74T11 05/28/81 16:14:44
```

```
HSTG4*STLPRG(1).MWLYN1(6)
      SUBROUTINE TWRITE(IYEAR1,INDEX)                                   Y
C     SUBROUTINE TO OUTPUT MW MATRIX TO MASTER MAGNETIC TAPE
      PARAMETER LYRS = 130, NA1 = 42*LYRS, NA2 = 14*LYRS               @NS7407
      COMMON/COM1/DUMMY(NA1), MW(14,LYRS,3), DUM(NA2)                  @NS7407
     *      /COM3/IHDG(4)                                               Y
      DIMENSION NEXTID(5),XVAL(12,3),JHDG(5)                            Y
      INTEGER XVAL                                                      Y
      DATA JHDG(5)/4HSAUN/                                              Y
      IFLAG = 0
      DO 97 I = 1,4                                                     Y
   97 JHDG(I) = IHDG(I)                                                 Y
    1 READ(8) NEXTID,NYRS                                               Y
      IF(IFLAG.EQ.1.AND.NEXTID(1).EQ.4H9999) GO TO 99
      IF(IFLAG.EQ.1) GO TO 2
      IF(NEXTID(1).EQ.4H9999) GO TO 5
      DO 7 I = 1,5                                                      Y
      IF(NEXTID(I).GT.JHDG(I)) GO TO 5                                  Y
      IF (NEXTID(I).LT.JHDG(I))GO TO 2                                  Y
    7 CONTINUE                                                          Y
      GO TO 10                                                          Y
    2 WRITE (9) NEXTID,NYRS                                             Y
      DO 3 I=1,NYRS                                                     Y
      READ(8) IYEAR,XVAL                                                Y
    3 WRITE(9) IYEAR,XVAL                                               Y
      GO TO 1                                                           Y
   10 WRITE(6,11)                                                       Y
   11 FORMAT(//////10X,110HIDENTIFICATION FOR NEW CASE IS THE SAME AS TH Y
     *AT FOR THE PREVIOUS ONE, PREVIOUS CASE HAS BEEN DELETED FROM TAPE) Y
      DO 13 I=1,NYRS                                                    Y
   13 READ(8) IYEAR,XVAL                                                Y
      READ(8) NEXTID,NYRS                                               Y
    5 WRITE(6,105)JHDG
  105 FORMAT(1H1,9X, 6HSTUDY(,5A4, 26H) IS BEING WRITTEN ON TAPE)
      WRITE(9) JHDG,INDEX
      IFLAG = 1
      DO 20 J=1,INDEX                                                   Y
      DO 16 K=1,3                                                       Y
      DO 12 I=1,3                                                       Y
   12 XVAL(I,K) = MW(I,J,K)                                             Y
      X = MW(4,J,K) + MW(5,J,K)                                         Y
      X = X*0.5                                                         Y
      XVAL(4,K) = IROUND(X)                                             Y
      DO 14 I=5,11                                                      Y
      II = I + 1                                                        Y
   14 XVAL(I,K) = MW(II,J,K)                                            Y
      X = MW(13,J,K) + MW(14,J,K)                                       Y
      X = X * 0.5                                                       Y
   16 XVAL(12,K) = IROUND(X)                                            Y
      IYEAR = IYEAR1+J                                                  Y
      WRITE(9) IYEAR,XVAL                                               Y
   20 CONTINUE                                                          Y
      IF(NEXTID(1).NE.4H9999) GO TO 2
   99 WRITE(9) NEXTID,NYRS                                              Y
      END FILE 9                                                        Y
      REWIND 8
      REWIND 9
```

-246-

```
****** MWLYW1/            ******                                                    DATE 052881        PAGE    25

   57          RETURN                                                                  Y
   58          END                                                                     Y

HDG  ****** MAPLOAD/            ******

PRT,S  HSTG4*STLPRG.MAPLOAD/
URPUR 28R1.H2.6 E35 S74T11 05/29/81 16:14:45
```

-247-

```
HSTG4*STLPRG(1),MAPLOAD(2)
     1      @MSG,N MAP RUNSTREAM STATEMENTS FOR NECESSARY ELEMENTS
     2      @MAP,I  ,STLPRG,XQT
     3      IN STLPRG.MWLYM2
     4      IN STLPRG.MWLYC1
     5      IN STLPRG.MWLYD1
     6      IN STLPRG.MWLYE1
     7      IN STLPRG.MWLYF2
     8      IN STLPRG.MWLYL1
     9      IN STLPRG.M3D1M1
    10      IN STLPRG.MWLYG1
    11      IN STLPRG.MWLYR1
    12      IN STLPRG.MWLYT1
    13      IN STLPRG.MWLYW1
    14      IN STLPRG.MWLYM2
    15      END

@HDG  ****** MWLYM2/ ******

@PRT,S  HSTG4*STLPRG.MWLYM2/
FURPUR 29R1.M2.6 E35 S74T11 05/28/81 16:14:45
```

```
HSIG4*STLPRG(1).MWLYM2(71)
      1          DIMENSION MNTH(14),DIV(14),IOUT(3),TADU(3),KRS(14)
      2      C   MAIN EXECUTABLE PROGRAMME - OPERATING INSTRUCTIONS IN
      3      C   ADDENDUM METHODOLOGY IN APPENDIX E
      4          INTEGER   FLOW,DIV
      5          PARAMETER LYRS = 150                                    @NS7407
      6          DATA MNTH/4H JAN,4H FEB,4H MAR,4H APR,4H APP,4H MAY,4H JUN,4H JUL,WLWM1020
      7         *          4H AUG,4H SEP,4H OCT,4H NOV,4H DEC,4H DEC /,K/0/  WLWM1030
      8          DATA KRS/744,672,744,2*360,744,720,2*744,720,744,720,360,384/
      9          COMMON/COM1/ONTL(14,LYRS), FORE(14,LYRS), FLOW(14,LYRS),.  @NS7407
     10         *       MWD(14,LYRS), MWN(14,LYRS), MWPEAK(14,LYRS), MWDN(14,LYRS) @NS7407
     11          COMMON /COM5/IYEAR1
     12         *       /COM2/IYEAR,JYEAR,IMONTH,JMONTH                   WLWM1060
     13         *       /COM3/IHDG(4)                                     WLWM1065
     14         *       /COM6/ MWMD(14,LYRS), MWHN(14,LYRS)               @NS7407
     15          COMMON /ADJUST/ ALEVEL, AFLOW
     16          COMMON LINE                                             WLWM1066
     17          DATA DIV/2*0,2*1000,2000,7*3000,2000,0/
     18          LINE= 52                                                WLWM1072
     19          READ(5,80) IHD6                                         WLWM1075
     20       80 FORMAT(  4A4  )                                         WLWM1076
     21          CALL LINECT                                             WLWM1078
     22          READ (5,402) ALEVEL,AFLOW
     23      402 FORMAT (F6.2,F6.0)
     24          CALL CARDRD(1)                                          WLWM1080
     25          IYEAR1 = JYEAR                                          WLWM1090
     26          INDEX = 1                                               WLWM1100
     27          GO TO 10                                                WLWM1110
     28      C
     29        5 CALL CARDRD(INDEX)                                      WLWM1120
     30          IF(IYEAR.NE.9999)GO TO 10                               WLWM1130
     31          INDEX = INDEX - 1                                       WLWM1139
     32          CALL DURAT(IYEAR1,INDEX)                                WLWM1140
     33          CALL TWRITE(IYEAR1,INDEX)
     34          STOP                                                    WLWM1150
     35      C
     36       10 IF(ONTL(JMONTH,INDEX).GE.235.0.AND.ONTL(JMONTH,INDEX).LE.252.0)GO WLWM1151
     37         *TO 15                                                   WLWM1152
     38          WRITE(6,90)MNTH(JMONTH),JYEAR,ONTL(JMONTH,INDEX)        WLWM1153
     39          CALL LINECT                                             WLWM1153
     40       90 FORMAT(10X,22HLAKE ONTARIO LEVEL FOR,A4,2H, ,I4,  4H IS , F6.2 ,  WLWM1154
     41         * 73H. IT SHOULD BE BETWEEN 235.00 AND 252.00 FT. -NO RESULTS FOR  WLWM1155
     42         *THIS MONTH.)                                            WLWM1155
     43          K = 1                                                   WLWM1156
     44       15 IF(FLOW(JMONTH,INDEX).GE.150000 .AND.FLOW(JMONTH,INDEX).LE.370000 WLWM1157
     45         *)GO TO 17                                               WLWM1157
     46          K = 1                                                   WLWM1158
     47          WRITE(6,95) MNTH(JMONTH),JYEAR,FLOW(JMONTH,INDEX)       WLWM1159
     48          CALL LINECT                                             WLWM1159
     49       95 FORMAT(10X,24HLAKE ONTARIO OUTFLOW FOR,A4,2H, ,I4, 4H IS , I6,   WLWM1160
     50         * 73H. IT SHOULD BE BETWEEN 150000 AND 370000 CFS. -NO RESULTS FOR WLWM1161
     51         *THIS MONTH.)                                            WLWM1162
     52       17 IF(K.EQ.0)GO TO 18                                      WLWM1163
     53       16 IOUT(1) = 0
     54          IOUT(2) = 0
     55          IOUT(3) = 0
     56          MWD(JMONTH,INDEX) = 0
```

```
      MWN(JMONTH,INDEX) = 0
      MWPEAK(JMONTH,INDEX) = 0
      K = 3                                                          @LWM116A
      GO TO 19                                                       @LWM116A
C
   18 FORE(JMONTH,INDEX) = FOREPY(ONTL(JMONTH,INDEX),FLOW(JMONTH,INDEX))@LWM1169
      IF(FORE(JMONTH,INDEX).GT.0.0 .OR. FORE(JMONTH,INDEX).LT.0.0)   @NS7407
     *                    GO TO 7                                     @NS7407
      GO TO 6                                                        @NS7407
    7 CONTINUE                                                       @NS7407
      IPLANT = FLOW(JMONTH,INDEX)-DIV(JMONTH)
      IF(IPLANT.LE.265000)IADD(1)=15000
      IF(IPLANT.GT.265000)IADD(1)=280000-IPLANT
      IF(IPLANT.GT.280000)IADD(1)=0
C --REMOVED-- JUL 78 --      IF(IPLANT.GT.320000)IADD(1)=320000-IPLANT
      IF(JMONTH.GE.4.AND.JMONTH.LT.14)GO TO 450
C          'BASE-CASE' STUDY FOR ST. LAWRENCE STATIONS                JUL 1978
C                                                                     JUL 1978
      IADD(3) = 38000                                                JUL 1978
      IF ( IPLANT .GT. 242000 ) IADD(3) = 280000 - IPLANT            JUL 1978
      IF ( IPLANT .GT. 280000 ) IADD(3) = 0                          JUL 1978
      GO TO 460
    6 IOUT(1)=0
      IOUT(2)=0
      IOUT(3)=0
      MWHD(JMONTH,INDEX)=0
      MWDN(JMONTH,INDEX)=0
      MWHN(JMONTH,INDEX)=0
      GO TO 19
  450 IF(IPLANT.LE.250000)IADD(3)=30000
      IF(IPLANT.GT.250000)IADD(3)=280000-IPLANT
      IF(IPLANT.GT.280000)IADD(3)=0
C --REMOVED-- JUL 78 --  460 IF(IPLANT.GT.320000)IADD(3)=320000-IPLANT
  460 IADD(2) = -2 * IADD(1)                                         JUL 1978
      IF(IADD(2).GT.0)IADD(2) = IADD(1)
      DO 500 L = 1,3
      YFLOW = IPLANT+IADD(L)
      YTAIL = TAILW(YFLOW)
      HEAD = FORE(JMONTH,INDEX) - YTAIL
      X = OUT(HEAD,YFLOW) + 0.5
      IOUT(L) = IROUND(X)
  500 CONTINUE
      MWD(JMONTH,INDEX) = IOUT(1)
      MWN(JMONTH,INDEX) = IOUT(2)
      MWPEAK(JMONTH,INDEX) = IOUT(3)
      IF(JMONTH.EQ.2) KRS(2) = (28+LEAP(IYEAR))+28
      KRSN = KRS(JMONTH) / 3
      MWHD(JMONTH,INDEX) = IOUT(1) * KRSN * 2
      MWHN(JMONTH,INDEX) = IOUT(2) * KRSN
      MWDN(JMONTH,INDEX) = (2.0*IOUT(1)+IOUT(2))/3.0
C
   19 WRITE(6,200)IYEAR,MNTH(JMONTH),ONTL(JMONTH,INDEX),FORE(JMONTH,INDE
     *X),                                                 FLOW(JMONTH,INDE
     1X),IOUT(1),MWHD(JMONTH,INDEX),IOUT(2),MWHN(JMONTH,INDEX),IOUT(3)
     2,MWDN(JMONTH,INDEX)
  200 FORMAT(1X,I4,A4,6X,F12.2,5X,F8.2,I11,1X,2(3X,I11),2(I9,5X),I6,5X,
     * I6)
```

```
      GO TO(30,30,30,20,25,30,30,30,30,30,30,30,20,27),JMONTH          WLWM1310
   20 WRITE(6,300)                                                     WLWM1320
      GO TO 30                                                         WLWM1325
   25 WRITE(6,310)                                                     WLWM1330
      GO TO 30                                                         WLWM1335
   27 WRITE(6,320)                                                     WLWM1340
      GO TO 30                                                         WLWM1345
  300 FORMAT(1H+,9X,5H01-15)
  310 FORMAT(1H+,9X,5H16-30)
  320 FORMAT(1H+,9X,5H16-31)
C
   30 JMONTH = JMONTH + 1                                              WLWM1370
      CALL LINECT                                                      WLWM1375
      GO TO (10,10,10,10,10,10,10, 5,10,10,10,10,10,10,40),JMONTH      WLWM1380
   40 JMONTH = 1                                                       WLWM1390
      JYEAR = JYEAR + 1                                                WLWM1400
      INDEX = INDEX + 1                                                WLWM1405
      IF(INDEX.GT.LYRS) GO TO 60                                       @NS7407
      GO TO 5                                                          WLWM1480
   60 KKK = LYRS                                                       @NS7407
      WRITE(6,600) KKK                                                 @NS7407
  600 FORMAT(5X,'*** FATAL ERROR ***  NO. OF YEARS EXCEEDS ', I4,/)    @NS7407
      CALL EXIT                                                        @NS7407
      END                                                              WLWM1490

@END
@END IGNORED - IN CONTROL MODE

@FIN
```

RUNID:XLERIE ACCT:AN9320 PROJ:HSTG4 MAX SUPS 00:10:00

SEND OUTPUT TO DENT-HISF3

XLERIM FIN

PRIORITY: 0 TAPEMOUNTS: 0 MAX SERVOS: 0 ACTUAL SUPS 00:00:35

MAX CORE: 2200 MAX TRACKS: 16 CPU TIME 00:00:00

IMAGES IN: 44 CARDS OUT: 0 PAGES OUT: 31

LAPSED MINS: 0 ARR 11:01 TERM 16:14:46 28MAY81 COST $ .34

```
* * * * * * UNIVAC 1100 TIME/SHARING EXEC --- MULTI-PROCESSOR SYSTEM --- LEV. 1182*V52     SITE * U11-80  * * * * * *
```

```
                XX        XX      LL              EEEEEEEEEEEE    RRRRRRRRR          IIIIII      FFFFFFFFFFFF
                XX        XX      LL              EEEEEEEEEEEE    RRRRRRRRRR         IIIIII      FFFFFFFFFFFF
                 XX      XX       LL              EE              RR        RR         II          FF
                 XX  XX           LL              EE              RR        RR         II          FF
                  XXXX            LL              EE              RR        RR         II          FF
                   XX             LL              EEEEEEEE        RRRRRRRRR          II          FFFFFFFF
                   XX             LL              EEEEEEEE        RRRRRRRRR          II          FFFFFFFF
                  XXXX            LL              EE              RR     RR          II          FF
                 XX  XX           LL              EE              RR      RR         II          FF
                XX    XX         LL              EE              RR       RR        II          FF
               XX      XX        LLLLLLLLLLLL    EEEEEEEEEEEE    RR        RR       IIIIII      FF
               XX      XX        LLLLLLLLLLLL    EEEEEEEEEEEE    RR        RR       IIIIII      FF


DDDDDDD     EEEEEEEE  NN      NN  TTTTTTTT          KK    KK          GGGGGGG
DDDDDDDD    EEEEEEEE  NNN     NN  TTTTTTTT          KK   KK          GGGGGGGG
DD     DD   EE        NNNN    NN     TT            KK  KK           GG
DD     DD   EE        NN NN   NN     TT            KK KK            GG
DD     DD   EE        NN  NN  NN     TT            KKKK             GG
DD     DD   EEEEE     NN   NNNN     TT            KKK              GG
DD     DD   EEEEE     NN    NNN     TT            KKK              GG
DD     DD   EE        NN     NN     TT            KKKK             GG
DD     DD   EE        NN     NN     TT            KK KK            GG
DD     DD   EE        NN     NN     TT            KK  KK           GG      GG
DDDDDDDD    EEEEEEEE  NN     NN     TT            KK   KK          GGGGGGGG
DDDDDDD     EEEEEEEE  NN     NN     TT            KK    KK         GGGGGG

BENT K G

* * * * * * UNIVAC 1100 TIME/SHARING EXEC --- MULTI-PROCESSOR SYSTEM --- LEV. 1182.V52     SITE * U11-80   * * * * * *


MM      MM    1   5555555  FFFFFFFF  3333333
MM      MM   11   5555555  FFFFFFFF  3333333
MM      MM  111   55       FF              33
MM      MM   11   55       FF              33
MM      MM   11   55       FF            33
MMMMMMMMM    11    55555   FFFFF       33
MMMMMMMMM    11       55   FFFFF       33
MM      MM   11       55   FF            33
MM      MM   11       55   FF            33
MM      MM   11   55  55   FF            33
MM      MM   11    55555   FF        33  33
MM      MM  1111    555    FF        3333333

M1SF3

   RUNID * XLERIF      USER ID * GWTP          PART NUMBER * 00      INPUT DEVICE *          OUTPUT DEVICE * PR5

    FILE NAME * PR@@@@XLERIF          CREATED AT:  16:14:55 MAY 28,1981          PRINTED AT:  16:15:58 MAY 28,1981
```

```
@RUN,P    XLERIE,AN9320/GNTP,MSTR4,10,500
@LOG SEND OUTPUT TO DENT-H15F3
@ASG,A STLPR63.
```

```
@SSG,IKE   ,HSTG44STLPRG3.,Z
SSG 1AW1-M2 73R1M3 05/28/81 16:14:57
```

SS6 STREAM GENERATION STATEMENTS

Z	MWLYE1	1, 4
Z	MWLYJ1	1, 4
Z	SOUWLY-BC	1, 6
Z	M3D1M1	1, 4
Z	MWLYC1	5
Z	MWLYD1	5
Z	MWLYE1	5
Z	MWLYL1	5
Z	M3D1M1	5
Z	MWLYQ1	5
Z	MWLYR1	5
Z	MWLYT1	5
Z	MWLYW1	5
Z	MWLYM2	5
Z	MAPLOAD	1, 1
Z	MWLYQ1	1, 4
Z	MWLYC1	1, 4
Z	MWLYW1	1, 4
Z	MWLYL1	1, 4
Z	MWLYT1	1, 4
Z	MWLYR1	1, 4
Z	MWLYM2	6
Z	MAP	1, 1
Z	MWLYA2	5
Z	MWLYF2	5
Z	XGT	6
Z	MWLYF2	1, 4
Z	MWLYA2	1, 4
Z	MWLYM2	1, 4

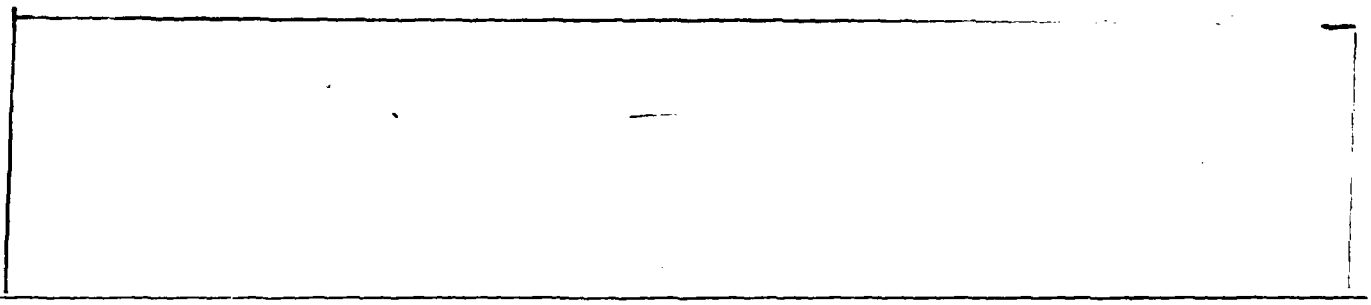
```
SSG   REVISED   SKELLTON

0001  00     *INCREMENT A FROM 1 BY 1 TO [7]
0002  01       *IF [Z,A,3,1] <5
0003  02         #HDG  ****** [Z,A,1,1]/[Z,A,2,1] ******
0004  02         #PRT,S  HSTG4*STLPRG3.[Z,A,1,1]/[Z,A,2,1]
0005  01       *END
0006  00     *LOOP
```

```
SSG   GENERATED OUTPUT STREAM       PART 1

000001              @HDG  ****** MWLYF1/              ******
000002              @PRT,S  HSTG4*STLPRG3.MWLYE1/
000003              @HDG  ****** MWLYD1/              ******
000004              @PRT,S  HSTG4*STLPRG3.MWLYD1/
000005              @HDG  ****** SOUWLY-BC/              ******
000006              @PRT,S  HSTG4*STLPRG3.SOUWLY-BC/
000007              @HDG  ****** M3D1M1/              ******
000008              @PRT,S  HSTG4*STLPRG3.M3D1M1/
000009              @HDG  ****** MAPLOAD/              ******
000010              @PRT,S  HSTG4*STLPRG3.MAPLOAD/
000011              @HDG  ****** MWLYQ1/              ******
000012              @PRT,S  HSTG4*STLPRG3.MWLYQ1/
000013              @HDG  ****** MWLYC1/              ******
000014              @PRT,S  HSTG4*STLPRG3.MWLYC1/
000015              @HDG  ****** MWLYW1/              ******
000016              @PRT,S  HSTG4*STLPRG3.MWLYW1/
000017              @HDG  ****** MWLYL1/              ******
000018              @PRT,S  HSTG4*STLPRG3.MWLYL1/
000019              @HDG  ****** MWLYT1/              ******
000020              @PRT,S  HSTG4*STLPRG3.MWLYT1/
000021              @HDG  ****** MWLYP1/              ******
000022              @PRT,S  HSTG4*STLPRG3.MWLYR1/
000023              @HDG  ****** MAP/              ******
000024              @PRT,S  HSTG4*STLPRG3.MAP/
000025              @HDG  ****** MWLYF2/              ******
000026              @PRT,S  HSTG4*STLPRG3.MWLYF2/
000027              @HDG  ****** MWLYA2/              ******
000028              @PRT,S  HSTG4*STLPRG3.MWLYA2/
000029              @HDG  ****** MWLYM2/              ******
000030              @PRT,S  HSTG4*STLPRG3.MWLYM2/

END SSG     TIME =  00:00:01  HIGHEST ADDRESS =  0061552  OCTAL

@HDG  ****** MWLYE1/              ******

@PRT,S  HSTG4*STLPRG3.MWLYE1/
FURPUR 28R1.M2.6 E3S S74T11 05/28/81 16:14:58
```

-254-

```
HST64*STLPRG3(1).MWLYE1(4)
      1          SUBROUTINE DURC(TITLE,TITLE1,B,M,INDEX,NUM)                    WLWE0010
      2          PARAMETER LYRS = 150                                           @NS7407
      3     C                                                                   WLWE0020
      4     C          THIS SUBROUTINE PRODUCES A DURATION REPORT CONTAINING    WLWE0030
      5     C                    -DATE                                         WLWE0040
      6     C                    -VALUE                                        WLWE0050
      7     C                    -ACCUMULATED TOTAL                            WLWE0060
      8     C                    -PERCENTAGE                                   WLWE0070
      9     C                    -AVERAGE VALUE                                WLWE0080
     10     C                                                                  WLWE0090
     11     C          INPUT- TITLE - 7 WORD TITLE AT TOP OF EACH PAGE         WLWE0100
     12     C                 - TITLE1- 3 WORD SUBTITLE APPENDED TO TITLE      WLWE0110
     13     C                 - B(2,LYRS) - ARRAY OF REAL VALUES AND DATES
     14     C                 - M(2,LYRS) - ARRAY OF INTEGER VALUES AND DATES
     15     C                 - INDEX - NUMBER OF VALUES IN B OR M             WLWE0140
     16     C                 - NUM = 1 IF INPUT IS REAL
     17     C                                                                  WLWE0160
     18          DIMENSION B(2,LYRS), M(2,LYRS), TITLE(7), TITLE1(3)           @NS7407
     19          COMMON/COM3/IHDG(4)                                           WLWE0175
     20          COMMON/COM4/ MWHYRD(LYRS), MWHYRN(LYRS)                       @NS7407
     21          COMMON /COM5/IYEAR1
     22     C                                                                  WLWE0180
     23     C               SET INITIAL VALUES                                 WLWE0190
     24     C                                                                  WLWE0200
     25          LINE=60                                                       WLWE0210
     26          SUM=0.                                                        WLWE0230
     27          ISUM=0                                                        WLWE0240
     28          ISUMD = 0
     29          ISUMN = 0
     30          IFIRST = IYEAR1+1
     31          ILAST = IYEAR1+INDEX
     32     C                                                                  WLWE0250
     33     C               SORT VALUES IN M(2,INDEX) IN DESCENDING ORDER      WLWE0260
     34     C                                                                  WLWE0270
     35          INDI=INDEX-1                                                  WLWE0280
     36          DO 9 I=1,INDI                                                 WLWE0290
     37          INDJ=I+1                                                      WLWE0300
     38          DO 8 J=INDJ,INDEX                                             WLWE0310
     39          IF (M(1,I)-M(1,J))6,7,8                                       WLWE0320
     40        7 IF (M(2,I).LE.M(2,J))GO TO 8                                  WLWE0325
     41        6 M1=M(1,I)                                                     WLWE0330
     42          M2=M(2,I)                                                     WLWE0340
     43          M(1,I)=M(1,J)                                                 WLWE0350
     44          M(2,I)=M(2,J)                                                 WLWE0360
     45          M(1,J)=M1                                                     WLWE0370
     46          M(2,J)=M2                                                     WLWE0380
     47        8 CONTINUE                                                      WLWE0390
     48        9 CONTINUE                                                      WLWE0400
     49          DO 10 I=1,INDEX                                               WLWE0410
     50     C                                                                  WLWE0420
     51     C               CALCULATE ACCUMULATED TOTAL AND PERCENTAGE AND WRITE LINE WLWE0430
     52     C               OF OUTPUT                                          WLWE0440
     53     C                                                                  WLWE0450
     54          LINE=LINE+1                                                   WLWE0460
     55          IF (LINE.LE.53)GO TO 5                                        WLWE 470
     56     C                                                                  WLWE0480
```

```
      C                COMMENCE A NEW PAGE -WRITE TITLES                    WLWE0490
      C                                                                     WLWE0500
            LINE = 8
            WRITE(6,200) IHDG,IFIRST,ILAST
        200 FORMAT (1H1,34X,61HEVALUATION OF REGULATIONS FOR GREAT LAKES LEVELWLWE0540
           1S AND OUTFLOWS,16X,4A4 /,50X,31H SAUNDERS OR MOSES PLANT OUTPUT
           2 31X,I4,1H-,I4/)
            WRITE (6,201)(TITLE(J),J=1,7),(TITLE1(J),J=1,3)                 WLWE0560
        201 FORMAT (38X,21HDURATION LISTING FOR ,10A4/)
            IF(NUM.NE.10) WRITE(6,202)
        202 FORMAT (23X,4HYEAR,20X,5HVALUE,15X,17HACCUMULATED VALUE,11X,10HPERWLWE0590
           1CENTAGE/)                                                       WLWE0600
            IF(NUM.EQ.10) WRITE(6,106)
          5 X=I                                                             WLWE0610
            Y=INDEX                                                         WLWE0620
            PERC=(2.*X-1.)/Y*50.                                            WLWE0630
            IF(NUM.EQ.10) GO TO 20
            IF(NUM.GE.3) GO TO 2
      C                                                                     WLWE0650
      C                INPUT VALUES ARE REAL                              WLWE0660
      C                                                                     WLWE0670
          1 SUM=SUM+B(1,I)                                                  WLWE0680
            WRITE (6,101)M(2,I),B(1,I),SUM,PERC                             WLWE0690
        101 FORMAT (23X,I4,17X,F8.2,18X,F9.2,17X,F6.2)                      WLWE0700
            GO TO 10                                                        WLWE0710
      C                INPUT VALUES ARE INTEGER                           WLWE0720
      C                                                                     WLWE0730
      C                                                                     WLWE0740
          2 ISUM=ISUM+M(1,I)                                                WLWE0750
            WRITE (6,102)M(2,I),M(1,I),ISUM,PERC                            WLWE0760
        102 FORMAT (23X,I4,17X,T8,17X,I10,17X,F6.2)                         WLWE0770
            GO TO 10
         20 IND = M(2,I) - IYEAR)
            ISUM = ISUM + M(1,I)
            ISUMD = ISUMD + MWHYRD(IND)
            ISUMN = ISUMN + MWHYRN(IND)
            WRITE(6,105) M(2,I),MWHYRD(IND),ISUMD,MWHYRN(IND),ISUMN,M(1,I),
           1ISUM,PERC
        105 FORMAT (11X,I4,4X, 3(I10,5X,I12,7X),F6.2)
        106 FORMAT (29X,7HDAYTIME,25X,9HNIGHTTIME,20X,5HTOTAL,/  11X,4HYEAR,
           1 3(4X,33HENERGY(MWH)  ACCUMULATED VALUE),2X,10HPERCENTAGE)
         10 CONTINUE                                                        WLWE0780
      C                                                                     WLWE0790
      C                WRITE AVERAGE VALUE AT END OF REPORT               WLWE0800
      C                                                                     WLWE0810
            IF(NUM.EQ.10) GO TO 21
            IF(NUM.GE.3) GO TO 4
          3 SINO=INDEX                                                      WLWE0830
            SUM=SUM/SINO.                                                   WLWE0840
            WRITE (6,103)ISUM                                               WLWE0850
        103 FORMAT (1H+,105X,15HAVERAGE VALUE  ,F8.2)                       WLWE0860
            RETURN                                                          WLWE0870
          4 ISUM=(ISUM+INDEX/2)/INDEX                                       WLWE0880
            WRITE (6,104)ISUM                                               WLWE0890
        104 FORMAT (1H+,105X,14HAVERAGE VALUE ,I9)                          WLWE0900
            RETURN                                                          WLWE0910
         21 ISUMD = (ISUMD+INDEX/2)/INDEX
```




```
      ISUMN = (ISUMN+INDEX/2)/INDEX
      ISUM  = (ISUM +INDEX/2)/INDEX
      WRITE(6,107) ISUMN , ISUMN , ISUM
  107 FORMAT (/4X, 13HAVERAGE VALUE,2X,3(I10,24X))
      RETURN
      END                                                    WLWE0920
```

```
@HDC  ****** MWLYD1/          ******

@PRT,S  HSIG4*STLPRG3.MWLYD1/
FORFOR 28R1.H2.6 E35 S74T11 05/28/81 16:14:59
```

```
HSTG4*STLPRG3(1),MWLYD1(4)
      1            SUBROUTINE DURAT (IYEAR1,INDEX)                          LWD10010
      2            PARAMETER    LYRS = 130                                  @NS7407
      3      C                                                               LWD10020
      4      C             THE SUBROUTINE PRODUCES THE DURATION CURVES       LWD10030
      5      C                  (1) FOR EACH MONTH FOR                       LWD10040
      6      C                           - LAKE ONTARIO LEVEL    A(14,LYRS,1) @NS7407
      7      C                           - LAKE ONTARIO FLOW     A(14,LYRS,2) @NS7407
      8      C                           - DAYTIME OUTPUT        A(14,LYRS,3) @NS7407
      9      C                           - NIGHTTIME OUTPUT      A(14,LYRS,4) @NS7407
     10      C                           - PEAK OUTPUT           A(14,LYRS,5) @NS7407
     11      C                  (2) FOR TOTAL ANNUAL ENERGY
     12      C                                                               LWD10100
     13      C             INPUT :  IYEAR1 - THE BEGINNING YEAR              LWD10110
     14      C                      INDEX - THE NUMBER OF YEARS              LWD10120
     15      C                                                               LWD10130
     16      C             SUBROUTINE  USED :                                LWD10140
     17      C                      DURC(TITLE,TITLE1,B,M,INDEX,NUM)         LWD10150
     18      C                                                               LWD10160
     19            COMMON/COM1/ A(14,LYRS,7)                                 @NS7407
     20            COMMON/COM4/ MWHYRD(LYRS), MWHYRN(LYRS)                   @NS7407
     21            COMMON/COM6/ IA(14,LYRS,2)                                @NS7407
     22            DIMENSION B(2,LYRS), TITLE(7,7), TITLE1(3,14), TITLE2(7),  @NS7407
     23           *       TITLE3(3), M(2,LYRS), MWHYRT(LYRS)                  @NS7407
     24            EQUIVALENCE (B(1),M(1))                                   LWD10200
     25            DATA TITLE/4H LAK,4HE ON,4HT LE,4HVELS,4H (FT,4H)  F,2HOR,
     26           *4HHEAD,4H WAT,4HER L,4HEVEL,4HS (F,4HT) F,2HOR,4HLAKE,4H ONT,
     27           *4H OUT,4HFLOW,4HS(CF,4HS) F,2HOR,
     28           2           4HDAYT,4HIME ,4HENER,4HGY ( ,4HMW) ,4H   F,2HOR,
     29           3            4HNIGH,4HTTIM,4HE EN,4HERGY,4H (MW,4H)  F,2HOR,
     30           4            4HPEAK,4H PLA,4HNT O,4HUTPU,4HT (F,4HW) F,2HOR,
     31           5            4HAVER,4HAGE ,4HMONT,4HHLY ,4HENER,4HGY F,2HOR/
     32            DATA TITLE2/4HTOTA,4HL PL,4HANT ,4HMWH ,4HOUTP,4HUT F,2HOR/
     33           1     TITLE3/4HMWHO,4HE YE,2HAR/
     34           2                    TITLE1/4HJANU,3HARY,1H ,4HFEBR,4HUARY,1H ,4HM
     35           3ARC,1HH,1H ,4HAPR ,4HC1-1,1HS,3HAPR,4H16-3,1HO,3HMAY,1H ,1H ,4HJUNLWD10240
     36           4E,1H ,1H ,4HJULY,1H ,1H ,4HAUGU,2HST,1H ,4HSEPT,4HEMBE,1HP,4HOCTO,LWD10250
     37           53HBER,1H ,4HNOVE,4HMBER,1H ,4HDEC ,4HO1-1,1HS,4HDEC ,4H16-3,1H1/  LWD10260
     38            DATA MWHYRD/LYRS*0/MWHYRN/LYRS*0/                         @NS7407
     39      C                                                               LWD10310
     40      C             PROGRAM BEGINS                                    LWD10320
     41      C                                                               LWD10330
     42            IYEAR1=IYEAR1-1                                           LWD10340
     43            DO 11 K = 1,7
     44      C                                                               LWD10400
     45      C             PRODUCE DURATION CURVES FOR EACH MONTH
     46      C                                                               LWD10431
     47            DO 16 I=1,14                                              LWD10432
     48      C                                                               LWD10434
     49      C             PRODUCE DURATION CURVES FOR ONE  MONTH            LWD10436
     50      C                                                               LWD10438
     51      C                                                               LWD10440
     52      C             MOVE DATA AND YEARS TO ARRAY B                    LWD10450
     53      C                                                               LWD10460
     54            DO 10 J=1,INDEX                                           LWD10470
     55            B(1,J)=A(I,J,K)                                           LWD10480
     56         10 M(2,J)=IYEAR1+J                                           LWD10490
```

```
C                                                                    LWD10500
C                 CALL SUBROUTINE TO PRODUCE DURATION CURVE          LWD10510
C                                                                    LWD10520
   16 CALL DURC(TITLE(1,K),TITLE1(1,I),B,M,INDEX,K)                  LWD10530
   11 CONTINUE                                                       LWD10531
      DO 30 I=1,INDEX
      DO 25 J=1,14
      MWHYRD(I) = MWHYRD(I) + IA(J,I,1)
      MWHYRN(I) = MWHYRN(I) + IA(J,I,2)
   25 CONTINUE
      MWHYRT(I) = MWHYRD(I) + MWHYRN(I)
   30 CONTINUE
      DO 40 J=1,INDEX
      IYEAR = IYEAR1 + J
      M(1,J) = MWHYRT(J)
   40 M(2,J) = IYEAR
      CALL DURC(TITLE2,TITLE3,B,M,INDEX,10)
      RETURN
      END
```

```
&HDG  ****** SOUWLY-BC/              ******

&PRT,S  HSIG4*STLPRG3.SOUWLY-BC/
FURPUR 28R1.H2.6 E35 S74I11 05/28/81 16:14:59
```

****** SOUWLY-RC/ ****** DATE 052881 PAGE 11

HSTG4*STLPRG3(1).SOUWLY-SC(0)
1 IN .MWLYM2

@HDG ****** M3D1M1/ ******

@PRT,S HSTG4*STLPRG3.M3D1M1/
FURFUR 28R1.H2.6 E3S S74T11 05/28/81 16:14:59

```
HSTG4*STLPRG3(1).M3D1M1(1)
      C
            FUNCTION LEAP(IYEAR)                                          30100010
      C [illegible] - FORTRAN V)                                          30100015
      C
      C FUNCTION LEAP EXAMINES THE INPUT YEAR TO DETERMINE WHETHER IT IS A   30100020
      C LEAP YEAR. WHEN THE INPUT YEAR IS A LEAP YEAR A FLAG IS SET TO 1. IF  30100030
      C IT IS NOT A LEAP YEAR THIS FLAG IS SET TO 0.                        30100040
      C
            ALPHA = IYEAR                                                 30100050
            BETA = ALPHA / 4.0                                            30100060
            LAMBDA = IYEAR / 4                                            30100070
            GAMMA = LAMBDA                                                30100080
      C
            IF (BETA.EQ.GAMMA) GO TO 200                                  30100090
      C
        100 LEAP = 0                                                      30100100
            GO TO 400                                                     30100110
      C
        200 IF (IYEAR.EQ.1900) GO TO 100                                  30100120
      C
        300 LEAP = 1                                                      30100130
      C
        400 RETURN                                                        30100140
      C
            END                                                           30100150
```

-266-

```
@HDG  ****** MAPLOAD/          ******

@PRT,S  HSTG4*STLPRG3.MAPLOAD/
FURFUR 28R1.H2.6 E35 S74T11 05/28/81 16:14:59
```

```
****** MAPLOAD/              ******                                                    DATE 052881        PAGE    13

HSTG4*STLPRG3(1).MAPLOAD(2)
      @MSG,N MAP DOWNSTREAM STATEMENTS FOR NECESSARY ELEMENTS
      @MAP,I   ,STLPRG3.XQT
      IN STLPRG3.MWLYA2
      IN STLPRG3.MWLYC1
      IN STLPRG3.MWLYD1
      IN STLPRG3.MWLYE1
      IN STLPRG3.MWLYF2
      IN STLPRG3.MWLYL1
      IN STLPRG3.M3D1M1
      IN STLPRG3.MWLYQ1
      IN STLPRG3.MWLYP1
      IN STLPRG3.MWLYT1
      IN STLPRG3.MWLYW1
      IN STLPRG3.MWLYM2
      END

@HDG  ****** MWLYQ1/              ******

@PRT,S  HSTG4*STLPRG3.MWLYQ1/
FURPUR 2ER1.H2.6 E35 S74T11 05/28/81 16:15:00
```

-267-

```
****** MWLYQ1/              ******                                                    DATE 052881        PAGE    14

HSTG4*STLPRG3(I).MWLYQ1(S)
      REAL    FUNCTION OUT(HEAD,PLANT)                                          WLWQ1001
C     CALCULATES PLANT OUTPUT
      DATA X1,X2,X3/-.22710024E04, .23514604E-01,-.32738665E-07 /              WLWQ1015
      DATA X4,X5,X6/-.20992935E04, .21559394E-01,-.30775518E-07 /              WLWQ1016
      X = 282590. +(HEAD-88.)* 3930./14.                                        WLWQ1020
      IF(PLANT.LE.X)GO TO 2                                                     WLWQ1030
      Y1  =  X4 + X5 * PLANT + X6 * PLANT**2                                    WLWQ1040
      Y2  =  X1 + X2 * PLANT + X3 * PLANT**2                                    WLWQ1045
      OUT = Y1 + ((Y2-Y1)/10.)*(HEAD-74.0)                                      WLWQ1050
      OUT = AMIND ( OUT , 1847.7 + 28.219429 * (HEAD-81.0) )                    JUL 1978
      RETURN                                                                    WLWQ1055
C
    2 IF(HEAD.GE.81.)ECONF =6.0 +(HEAD-81.0)*.533/7.0                           WLWQ1060
      IF(HEAD.LT.81.)ECONF =5.448 +(HEAD-74.)*.552/7.0                          WLWQ1070
C
      OUT = ECONF * PLANT/1000.                                                 WLWQ1080
      RETURN                                                                    WLWQ1090
      END                                                                       WLWQ1100

@HDG  ****** MWLYC1/              ******

@PRT,S  HSTG4*STLPRG3.MWLYC1/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 16:15:00
```

-268-

```
HSIG4*STLPRG3(1).MWLYC1(13)
      SUBROUTINE CARDRD(INDEX)                                          WLWC1010
C     READS AND STORES INPUT
      INTEGER FLOW,OUTPUT                                               WLWC1015
      PARAMETER LYRS = 130, MAXYR = 1989                                @NS7407
      COMMON/COM1/ ONTL(14,LYRS),DUMN(14,LYRS),FLOW(14,LYRS),           @NS7407
     *       FORE(14,LYRS),TAIL(14,LYRS),PLANT(14,LYRS),OUTPUT(14,LYRS) @NS7407
     *      /COM2/IYEAR,JYEAR,IMONTH,JMONTH                             WLWC1040
C
      COMMON /ADJUST/ALEVEL, AFLOW
      REAL      LEVEL(7),OUTFL(7)                                       WLWC1050
    1 READ(5,2)IYEAR,IMONTH,(LEVEL(I),OUTFL(I),I=1,7)                   WLWC1060
    2 FORMAT(I4,I2,4X,7(F5.2,F5.0))                                     WLWC1060
      IF(INDEX.NE.1)GO TO 5                                             WLWC1100
      JYEAR = IYEAR                                                     WLWC1110
      JMONTH = IMONTH                                                   WLWC1120
    5 IF(IYEAR.EQ.9999)RETURN                                           WLWC1130
      IF(IYEAR.LE.MAXYR) GO TO 7                                        @NS7407
      WRITE(6,6) IYEAR                                                  WLWC1150
      CALL LINECT                                                       WLWC1155
    6 FORMAT( 9X, 8H YEAR IS,I5,23H, CARD IS BEING IGNORED)             WLWC1160
      GO TO 1                                                           WLWC1170
    7 IF(IYEAR.LE.JYEAR)GO TO  15                                       WLWC1180
      WRITE(6,9)JYEAR, IYEAR                                            WLWC1190
      CALL LINECT                                                       WLWC1195
    9 FORMAT( 9X,29H WRONG YEAR, YEAR EXPECTED IS,I5,15H, YEAR FOUND IS,WLWC1200
     * I5,39H, ZEROS ARE INSERTED FOR MISSING VALUES)                   WLWC1210
      K = INDEX                                                         WLWC1220
      INDEX = INDEX + IYEAR - JYEAR                                     WLWC1230
      L = INDEX -1                                                      WLWC1240
      IL = JMONTH -1                                                    WLWC1250
      DO 12 I =K,L                                                      WLWC1260
   10 IL=IL+1                                                           WLWC1270
      IF(IL.GT.14)GO TO  11                                             WLWC1280
      ONTL(IL,I)= 0.                                                    WLWC1290
      FLOW(IL,I)= 0.                                                    WLWC1300
      FORE(IL,I)= 0.                                                    WLWC1310
      TAIL(IL,I)= 0.                                                    WLWC1320
      PLANT(IL,I)= 0.                                                   WLWC1330
      OUTPUT(IL,I)=0.                                                   WLWC1340
      DUMN(IL,I) = 0.
      GO TO 10                                                          WLWC1350
   11 IL=0                                                              WLWC1360
   12 CONTINUE                                                          WLWC1370
      JMONTH = 1                                                        WLWC1380
      JYEAR = IYEAR                                                     WLWC1390
      GO TO 20                                                          WLWC1400
   15 IF(IYEAR.EQ.JYEAR)GO TO 20                                        WLWC1410
      WRITE(6,18)JYEAR, IYEAR                                           WLWC1420
      CALL LINECT                                                       WLWC1425
   18 FORMAT( 9X,29H WRONG YEAR, YEAR EXPECTED IS,I5,15H, YEAR FOUND IS,WLWC1430
     * I5,17H, CARD IS IGNORED)                                         WLWC1440
      GO TO 1                                                           WLWC1450
   20 IF(IMONTH.EQ.JMONTH)GO TO 30                                      WLWC1460
      IF(JMONTH.EQ.1)GO TO 25                                           WLWC1470
      WRITE(6,22)IYEAR                                                  WLWC1480
      CALL LINECT                                                       WLWC1485
```

-269-

```
   22 FORMAT(10X,50H DUPLICATE CARD ENCOUNTERED FOR FIRST HALF OF YEAR, WLWC1490
     * I5,14H, CARD IGNORED)                                            WLWC1500
      GO TO 1                                                           WLWC1510
C
   25 WRITE(6,27) IYEAR                                                 WLWC1520
      CALL LINECT                                                       WLWC1525
   27 FORMAT( 9X,20H FIRST CARD FOR YEAR,I5,50H IS MISSING, ZEROS ARE INWLWC1530
     *SERTED FOR MISSING VALUES)                                        WLWC1540
      JMONTH=9                                                          WLWC1545
      I=0                                                               WLWC1550
   29 I = I + 1                                                         WLWC1560
      IF(I.GT.7)GO TO 30                                                WLWC1570
      ONTL(I,INDEX) = 0.                                                WLWC1580
      FLOW(I,INDEX) = 0.                                                WLWC1590
      FORE(I,INDEX)=0.                                                  WLWC1595
      TAIL(I,INDEX) = 0.                                                WLWC1600
      PLANT(I,INDEX)= 0.                                                WLWC1610
      OUTPUT(I,INDEX)=0.                                                WLWC1620
      GO TO 29                                                          WLWC1630
C
   30 I = 1                                                             WLWC1640
   40 ONTL(JMONTH,INDEX) = LEVEL(I) + ALEVEL                                  WLWC1650
      FLOW(JMONTH,INDEX) = OUTFL(I)* 10.0 + AFLOW                             WLWC1660
      I=I + 1                                                           WLWC1670
      JMONTH = JMONTH +1                                                WLWC1680
      IF(I.LE.7)GO TO 40                                                WLWC1690
      JMONTH = JMONTH -7                                                WLWC1700
      RETURN                                                            WLWC1710
      END                                                               WLWC1720
```

@HDG ****** MWLYW1/ ******

```
@PRT,S  HST64*STLPRG3.MWLYW1/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 16:15:01
```

-270-

```
HSTG4*STLPRC3(1).MWLYW1(8)
      SUBROUTINE TWRITE(IYEAR1,INDEX)                                   Y
C     SUBROUTINE TO OUTPUT MW MATRIX TO MASTER MAGNETIC TAPE
      PARAMETER LYRS = 130, NA1 = 42*LYRS, NA2 = 14*LYRS                QNS74C7
      COMMON/COM1/DUMMY(NA1), MW(14,LYRS,3), DUM(NA2)                   QNS74C7
     *      /COM3/IHDG(4)                                               Y
      DIMENSION NEXTID(5),XVAL(12,3),JHDG(5)                            Y
      INTEGER XVAL                                                      Y
      DATA JHDG(5)/4HSAUN/                                              Y
      IFLAG = 0
      DO 97 I = 1,4                                                     Y
   97 JHDG(I) = IHDG(I)                                                 Y
    1 READ(8) NEXTID,NYRS                                               Y
      IF(IFLAG.EQ.1.AND.NEXTID(1).EQ.4H9999) GO TO 99
      IF(IFLAG.EQ.1) GO TO 2
      IF(NEXTID(1).EQ.4H9999) GO TO 5
      DO 7 I = 1,5                                                      Y
      IF(NEXTID(I).GT.JHDG(I)) GO TO 5                                  Y
      IF (NEXTID(I).LT.JHDG(I))GO TO 2                                  Y
    7 CONTINUE                                                          Y
      GO TO 10                                                          Y
    2 WRITE (9) NEXTID,NYRS                                             Y
      DO 3 I=1,NYRS                                                     Y
      READ(8) IYEAR,XVAL                                                Y
    3 WRITE(9) IYEAR,XVAL                                               Y
      GO TO 1                                                           Y
   10 WRITE(6,11)                                                       Y
   11 FORMAT(//////10X,110HIDENTIFICATION FOR NEW CASE IS THE SAME AS TH Y
     *AT FOR THE PREVIOUS ONE, PREVIOUS CASE HAS BEEN DELETED FROM TAPE) Y
      DO 13 I=1,NYRS                                                    Y
   13 READ(8) IYEAR,XVAL                                                Y
      READ(8) NEXTID,NYRS                                               Y
    5 WRITE(6,105)JHDG
  105 FORMAT(1H1,9X, 6HSTUDY(,5A4, 26H) IS BEING WRITTEN ON TAPE)
      WRITE(9) JHDG,INDEX
      IFLAG = 1
      DO 20 J=1,INDEX                                                   Y
      DO 16 K=1,3                                                       Y
      DO 12 I=1,3                                                       Y
   12 XVAL(I,K) = MW(I,J,K)                                             Y
      X = MW(4,J,K) + MW(5,J,K)                                         Y
      X = X*0.5                                                         Y
      XVAL(4,K) = IROUND(X)                                             Y
      DO 14 I=5,11                                                      Y
      II = I + 1                                                        Y
   14 XVAL(I,K) = MW(II,J,K)                                            Y
      X = MW(13,J,K) + MW(14,J,K)                                       Y
      X = X * 0.5                                                       Y
   16 XVAL(12,K) = IROUND(X)                                            Y
      IYEAR = IYEAR1+J                                                  Y
      WRITE(9) IYEAR,XVAL                                               Y
   20 CONTINUE                                                          Y
      IF(NEXTID(1).NE.4H9999) GO TO 2
   99 WRITE(9) NEXTID,NYRS                                              Y
      END FILE 9                                                        Y
      REWIND 8
      REWIND 9
```

```
57          RETURN                                                  Y
58          END                                                     Y
```

```
@HD6  ****** MWLYL1/          ******

@PRT,S  HSTG4*STLPRC3.MWLYL1/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 16:15:02
```

```
HSTG4*STLPRG3(1).MWLYL1(S)
      SUBROUTINE LINECT                                                 WLWL0010
C     LINE ACCUMMULATION, PAGING AND TITLING
      COMMON LINE                                                       WLWL0012
      COMMON /COM3/IHDG(4)                                              WLWL0015
      IF(LINE.LT.47) GO TO 1
      WRITE(6,100) IHDG                                                 WLWL0040
      LINE=0                                                            WLWL0050
    1 LINE=LINE+1                                                       WLWL0060
      RETURN                                                            WLWL0070
  100 FORMAT(1H1,30X,61HEVALUATION OF REGULATIONS FOR GREAT LAKES LEVELSWLWL0080
     * AND OUTFLOWS,16X,4A4 /,46X,31H SAUNDERS OR MOSES PLANT OUTPUT,   WLWL0090
     * //18X,'LAKE ONTARIO',5X,'HW',5X,'LAKE ONTARIO',8X,'DAYTIME ENERGY
     *',8X,'NIGHTTIME ENERGY',10X,'PEAK',5X,'MONTHLY'/4X,'DATE',13X,
     * 'LEVEL',8X,'ELEV',7X,'OUTFLOW',7X,2('AVG. OUTPUT    ENERGY  '),
     * 4X,'OUTPUT',4X,'AVERAGE'/21X'(FT)',9X,'(FT)',8X,'(CFS)',11X,2('(M
     *W)',8X,'(MWH)',6X),
     *6H  (MW),7X,4H(MW)/)
      END                                                               WLWL0140

@HDC  ****** MWLYT1/          ******

@PRT,S  HSTG4*STLPRG3.MWLYT1/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 16:15:02
```

-273-

```
HSTG4*STLPRG3(1).MWLYT1(5)
      REAL FUNCTION  TAILW(PLANT)                                       WLWT1010
C     CALCULATION OF TAILWATER ELEVATION FOR A GIVEN FLOW
      COMMON/COM2/DUMMY(3),JMONTH                                       WLWT1020
      IF(JMONTH.LT.4)GO TO 10                                           WLWT1030
      TAILW = 0.14814668E 03 + 0.42526491E-04*PLANT - 0.25073493E-10*   WLWT1040
     *  (PLANT**2)                                                      WLWT1045
      RETURN                                                            WLWT1050
C
   10 TAILW = 0.14889419E 03+0.43055756E-04*PLANT - 0.25341969E-10 *    WLWT1070
     *  (PLANT**2)                                                      WLWT1080
      RETURN                                                            WLWT1090
      END                                                               WLWT1100

@HDC  ****** MWLYR1/          ******

@PRT,S  HSTG4*STLPRG3.MWLYR1/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 16:15:04
```

-274-

```
HSTG4*STLPRG3(1).MWLYR1(6)
     1          FUNCTION IROUND(X)                                  WLWR1010
     2      C   FUNCTION TO ROUND ANY NO. X TO FIRST DIGIT
     3          M= X                                                WLWR1020
     4          Y=M                                                 WLWR1030
     5          Z=  X-Y                                             WLWR1040
     6          IF(Z.GT.0.5) GO TO 20                               @NS7407
     7          IF(Z.LT.0.5) GO TO 30                               @NS7407
     8          L = M/2                                             @NS7407
     9          J = L*2                                             @NS7407
    10          IF(J.EQ.M) GO TO 30                                 @NS7407
    11       20 M = M + 1                                           @NS7407
    12       30 IROUND = M                                          @NS7407
    13          RETURN                                              WLWR1160
    14          END                                                 WLWR1170
```

@HOG ****** MAP/ ******

@PRT,S HSTG4*STLPRG3.MAP/
FURPUR 28R1.H2.6 E35 $74T11 05/28/81 16:15:05

```
HSTG4*STLPRG3(1).MAP(5)
      @MSG,N MAP RUNSTREAM STATEMENTS
      @MAP ,I ,STLPRG3.XQT
      IN STLPRG3.MWLYC1
      IN STLPRG3.MWLYP1
      IN STLPRG3.MWLYO1
      IN STLPRG3.MWLYW1
      IN STLPRG3.MWLYF2
      IN STLPRG3.MWLYA2
      IN STLPRG3.MWLYL1
      IN STLPRG3.MWLYT1
      IN STLPRG3.MWLYC1
      IN STLPRG3.MWLYM2
      IN STLPRG3.MWLYQ1
      IN STLPRG3.M3D1M1
      END

@HDG ****** MWLYF2/ ******

@PRT,S  HSTG4*STLPRG3.MWLYF2/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 16:15:06
```

-276-

```
MST64*STLPR63(1),MWLYF2(11)
      1            REAL FUNCTION FOREBY(ONTL,FLOW)                          WLWF1010
      2      C     FUNCTION TO CALCULATE FOREBAY ELEVATION FOR A GIVEN
      3      C     LAKE LEVEL AND OUTFLOW
      4      C     BACKWATER CALCULATION ALTERED FOR ADJUSTED BASE CASE CATEGORY 3
      5            COMMON/COM2/DUMMY(3),JMONTH                              WLWF1020
      6            COMMON/COM7/IFFF
      7            INTEGER FLOW,FLW                                           WLWF1025
      8            DIMENSION X(11,3)
      9            DATA X(1,1),X(1,2),X(1,3)/-.2428614E4,.2U350887E2,-.38573212E-1/,
     10           *     X(2,1),X(2,2),X(2,3)/-.31053960E4,.25803592E2,-.49561553E-1/,
     11           *     X(3,1),X(3,2),X(3,3)/-.41407250E4,.34217894E2,-.66666119E-1/,
     12           *     X(4,1),X(4,2),X(4,3)/-.53668322E4,.44113032E2,-.86737462E-1/,
     13           *     X(5,1),X(5,2),X(5,3)/-.69967926E4,.57365939E2,-.11358523E0/,
     14           *     X(6,1),X(6,2),X(6,3)/-.71789881E4,.58696986E2,-.11599381E0/,
     15           *     X(7,1),X(7,2),X(7,3)/-.97471073E4,.79535A9E2,-.15877817E0/,
     16           *     X(8,1),X(8,2),X(8,3)/-.11570245E5,.94201858E2,-.18778053E0/,
     17           *     X(9,1),X(9,2),X(9,3)/-.14172185E5,.11519025E3,-.23011591E0/,
     18           *     X(10,1),X(10,2),X(10,3)/-.13455436E5,.10903915E3,-.21696981E0
     19           */,X(11,1),X(11,2),X(11,3)/-.14797757E5,.11973098E3,-.2382654E0/
     20      C
     21            IF(JMONTH.LT.4)GO TO 10                                  WLWF1050
     22            FOREBY=APPROX(ONTL,FLOW)
     23            IF(FOREBY.GT.242.00)GO TO 20                             WLWF1061
     24            IF(FOREBY .GE. 230.00) RETURN
     25            IF(FOREBY.GT.0.0 .OR. FOREBY.LT.0.0) GO TO 7             BNS7407
     26            GO TO 6                                                  BNS7407
     27          7 WRITE(6,9)FOREBY
     28          9 FORMAT(10X,'FOREBAY ELEVATION IS',F8.2,' - TOO LOW. NO RESULTS FOR
     29           * THIS MONTH.')
     30            FOREBY=0
     31            CALL LINECT
     32            RETURN
     33      C
     34          6 WRITE(6,5)
     35          5 FORMAT(10X,'FOREBAY ELEVATION CALCULATION DOES NOT CONVERGE. NO RE
     36           *SULTS FOR THIS MONTH.')
     37            CALL LINECT
     38            RETURN
     39      C
     40         10   IF(IFFF.EQ.1)GO TO 40
     41              IF(IFFF.EQ.2)GO TO 35
     42      C       THIS DATA IS FOR SE015S2
     43              FLW=FLOW*0.9797
     44              GO TO 11
     45      C       THIS DATA IS FOR NRS25
     46         35   FLW=FLOW*0.9831
     47              GO TO 11
     48      C       THIS DATA IS FOR ADJ. BASE CASE AND SE06L
     49         40   FLW=FLOW*0.9865
     50           11 IFL = (FLW/10000) * 10000
     51              IFL1 = IFL                                               WLWF1062
     52              IF(IFL.LT. 280000) GO TO 14                              WLWF1063
     53              WRITE(6,12)                                              WLWF1064
     54              CALL LINECT                                              WLWF1084
     55           12 FORMAT(10X,     99HFLOW IS NOT BETWEEN 180000 AND 280000 CFS.  EXTWLWF1065
     56            *RAPOLATION IS NECESSARY TO OBTAIN FOREBAY ELEVATION.)     WLWF1065
```

PRECEDING PAGE BLANK-NOT FILMED

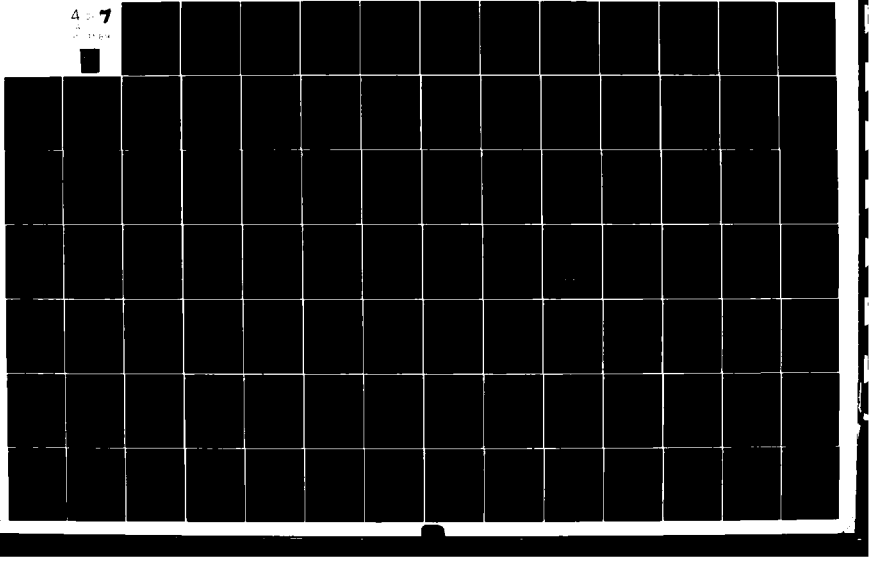
```
      IFL1 = 270000                                                    WLWF1066
   14 IF(IFL.GE. 180000)GO TO 16                                       WLWF1067
      IFL1 = 180000                                                    WLWF1068
      WRITE(6,12)                                                      WLWF1069
      CALL LINECT                                                      WLWF1070
   16 IFL2 = IFL1 + 10000                                              WLWF1071
      I = IFL1/10000 - 17                                              WLWF1072
      J = IFL2/10000 - 17                                              WLWF1073
      Y1 = X(I,1) + X(I,2)*ONTL + X(I,3)*ONTL**2                       WLWF1074
      Y2 = X(J,1) + X(J,2)*ONTL + X(J,3)*ONTL**2                       WLWF1075
      FOREBY = Y1 + ((Y2-Y1)/10000.)*(FL#-IFL1)
      IF( FOREBY .LT. 230.00 ) GO TO 7
      IF(FOREBY.LE.242.00) RETURN                                      WLWF1081
   20 WRITE(6,30) FOREBY                                               WLWF1082
   30 FORMAT(10X,19HFOREBY ELEVATION IS,F8.2,45H -TOO HIGH. IT HAS BEEN WLWF1083
     *CHANGED TO 242.00 FT.)                                           WLWF1084
      CALL LINECT                                                      WLWF1085
      FOREBY = 242.00                                                  WLWF1089
      RETURN                                                           WLWF1090
      END                                                              WLWF1100
```

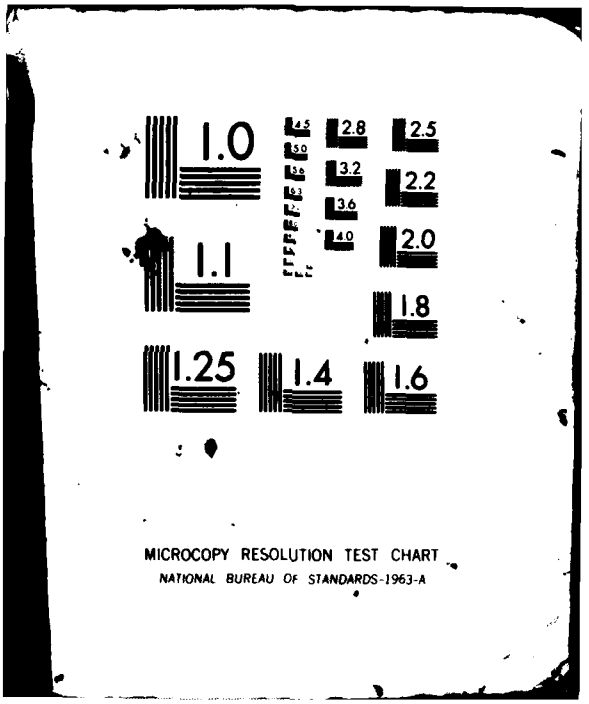
```
@HDG ****** MWLYA2/ ******

@PRT,S  HST64*STLPRG3.MWLYA2/
FURPUR 28R1.H2.6 E35 S7*T11 05/28/81 16:15:06
```

```
HSTG4*STLPRG3(1).MWLYA2(8)
      C
      REAL FUNCTION APPROX(ONTL,FLOW)
      C
      C     CALCULATION OF FOREBAY ELEVATION UNDER OPEN WATER CONDITIONS
      C     USING NEWTON-RAPHSON METHOD
            INTEGER FLOW,Z1
            COMMON/COM7/IFFF
      C
      C     FACTORS ALTERED TO MEET ADJUSTED BASE CASE CATEGORY 3 BACKWATER SPECIFICATIONS
            REAL*8 X,FX,FXP,T
            IF(IFFF.EQ.1)GO TO 20
            IF(IFFF.EQ.2)GO TO 25
      C     THIS IS THE DATA FOR SE015S2
            Z1=33150
            Z2=174.475
            Z3=902.02
            Z4=451.01
            GO TO 30
      C     THIS IS THE DATA FOR NRS25
      25    Z1=33150
            Z2=174.475
            Z3=902.22
            Z4=451.11
            GO TO 30
      C     THIS IS THE DATA FOR ADJ. BASE CASE AND SE06L
      20    Z1=33150
            Z2=174.475
            Z3=902.42
            Z4=451.21
      30    R=FLOW
            FORE=1.75*(ONTL - R/Z1) - Z2
            C1=ONTL-Z3
            C2=(Z4**2 - ONTL**2)
            C3=ONTL * (ONTL * (Z3-ONTL) - Z4**2)
           1  +(.0002730*FLOW)**2
      C
            X=FORE
            K=0
          1 FX=X**3 + C1*X**2 + C2*X + C3
            FXP=3*X**2 + 2*C1*X + C2
      C
          2 IF(K .GT. 0)GO TO 3
            J=K
            K=1
            NMAX=50
            N=0
          3 T=FX
            IF(ABS(T) .LE. .5)GO TO 5
          4 IF(N .EQ. NMAX)GO TO 6
            IF(.NOT. ABS(FXP) .GT. 0)GO TO 8
            T=X
            IF(T.LE.200.)GO TO 6
            X=X-FX/FXP
            N=N+1
            CALL OVERFL(I)
            IF(I .EQ. 1)GO TO 9
```

AD-A114 589 INTERNATIONAL LAKE ERIE REGULATION STUDY BOARD F/G 13/2
LAKE ERIE WATER LEVEL STUDY. APPENDIX E. POWER. ANNEX D. COMPUT--ETC(U)
JUL 81

UNCLASSIFIED NL




1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
4.5
5.0
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

```
      IF(.NOT. ABS(T-X) .GT. 0)GO TO 7
      GO TO 10
    5 K=2
      GO TO 10
    6 K=3
      GO TO 10
    7 K=4
      GO TO 10
    8 K=5
      GO TO 10
    9 K=6
C
   10 IF(K .EQ. 1)GO TO 1
      APPROX=X
      IF(K .EQ. 3)APPROX=0.0
C
      RETURN
C
      END
```

```
@HDG ****** MWLYM2/ ******

@PRT,S  HST64*STLPRG3.MWLYM2/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 16:15:06
```

```
HSTG4*STLPRG3(1).MWLYM2(2*)
      DIMENSION MNTH(14),DIV(14),IOUT(3),IADD(3),KRS(14)
C     MAIN EXECUTABLE PROGRAM - OPERATING INSTRUCTIONS IN ADDENDUM
C     METHODOLOGY IN APPENDIX E
C     SAME PROGRAMME AS STLPRG3. BUT WITH BACKWATER MODIFICATIONS
C     FOR ADJUSTED BASE CASE CATEGORY 3
      INTEGER   FLOW,DIV
      PARAMETER LYRS = 132                                          @NS7407
      DATA MNTH/4H JAN,4H FEB,4H MAR,4H APR,4H APR,4H MAY,4H JUN,4H JUL,WLWM1020
     *          4H AUG,4H SEP,4H OCT,4H NOV,4H DEC,4H DEC /,K/0/     WLWM1030
      DATA KRS/744,672,744,2*360,744,720,2*744,720,744,720,360,384/
      COMMON/COM1/ONTL(14,LYRS), FORE(14,LYRS), FLOW(14,LYRS),      @NS7407
     *      MWD(14,LYRS), MWN(14,LYRS), MWPEAK(14,LYRS), MWDN(14,LYRS) @NS7407
      COMMON /COM5/IYEAR1
     *      /COM2/IYEAR,JYEAR,IMONTH,JMONTH                         WLWM1060
     *      /COM3/IHDG(4)                                           WLWM1065
     *      /COM6/ MWHD(14,LYRS), MWHN(14,LYRS)                     @NS7407
     *     /COM7/IFFF
      COMMON /ADJUST/ ALEVEL, AFLOW
      COMMON LINE                                                   WLWM1066
      DATA DIV/2*0,2*1000,2000,7*3000,2000,0/
      LINE= 52                                                      WLWM1072
      READ(5,80) IHDG                                               WLWM1075
   80 FORMAT(  4A4  )                                               WLWM1076
      CALL LINECT                                                   WLWM1078
      READ (5,402) ALEVEL,AFLOW
  402 FORMAT (F6.2,F6.0)
C     ADDITIONAL CARD READ FOR FLAG 'IFFF'
C     IF IFFF=1 RUN BC & 6L
C     IF IFFF=2 RUN 25N
C     IF IFFF=3 RUN 15S
      READ(5,403)IFFF
403   FORMAT(I2)
      CALL CARDRD(1)                                                WLWM1080
      IYEAR1 = JYEAR                                                WLWM1090
      INDEX = 1                                                     WLWM1100
      GO TO 10                                                      WLWM1110
C
    5 CALL CARDRD(INDEX)                                            WLWM1120
      IF(IYEAR.NE.9999)GO TO 10                                     WLWM1130
      INDEX = INDEX - 1                                             WLWM1139
      CALL DURAT(IYEAR1,INDEX)                                      WLWM1140
      CALL TWRITE(IYEAR1,INDEX)
      STOP                                                          WLWM1150
C
   10 IF(ONTL(JMONTH,INDEX).GE.235.0.AND.ONTL(JMONTH,INDEX).LE.252.0)GO WLWM1151
     *TO 15                                                         WLWM1152
      WRITE(6,90)MNTH(JMONTH),JYEAR,ONTL(JMONTH,INDEX)              WLWM1153
      CALL LINECT                                                   WLWM1153
   90 FORMAT(10X,22HLAKE ONTARIO LEVEL FOR,A4,2H, ,I4,  4H IS , F6.2 , WLWM1154
     * 73H. IT SHOULD BE BETWEEN 235.00 AND 252.00 FT. -NO RESULTS FOR WLWM1155
     *THIS MONTH.)                                                  WLWM1155
      K = 1                                                         WLWM1156
   15 IF(FLOW(JMONTH,INDEX).GE.150000 .AND.FLOW(JMONTH,INDEX).LE.370000 WLWM1157
     *)GO TO 17                                                     WLWM1157
      K = 1                                                         WLWM1158
      WRITE(6,95) MNTH(JMONTH),JYEAR,FLOW(JMONTH,INDEX)             WLWM1159
```

```
      CALL LINECT                                                       WLWM1159
   95 FORMAT(10X,24HLAKE ONTARIO OUTFLOW FOR,A4,2H, ,I4, 4H IS , I6,    WLWM1160
     * 73H. IT SHOULD BE BETWEEN 150000 AND 370000 CFS. -NO RESULTS FOR WLWM1161
     *THIS MONTH.)                                                      WLWM1162
   17 IF(K.EQ.0)GO TO 18                                               WLWM1163
   16 IOUT(1) = 0
      IOUT(2) = 0
      IOUT(3) = 0
      MWO(JMONTH,INDEX) = 0
      MWN(JMONTH,INDEX) = 0
      MWPEAK(JMONTH,INDEX) = 0
      K = 0                                                             WLWM1166
      GO TO 19                                                          WLWM1168
C
   18 FORE(JMONTH,INDEX) = FOREBY(ONTL(JMONTH,INDEX),FLOW(JMONTH,INDEX))WLWM1169
      IF(FORE(JMONTH,INDEX).GT.0.0 .OR. FORE(JMONTH,INDEX).LT.0.0)      &NS7407
     *                    GO TO 7                                       &NS7407
      GO TO 6                                                           &NS7407
    7 CONTINUE                                                          &NS7407
      IPLANT = FLOW(JMONTH,INDEX)-DIV(JMONTH)
      IF(IPLANT.LE.265000)IADD(1)=15000
      IF(IPLANT.GT.265000)IADD(1)=280000-IPLANT
      IF(IPLANT.GT.280000)IADD(1)=0
C --REMOVED-- JUL 78 --       IF(IPLANT.GT.320000)IADD(1)=320000-IPLANT
      IF(JMONTH.GE.4.AND.JMONTH.LT.14)GO TO 450
C          'BASE-CASE' STUDY FOR ST. LAWRENCE STATIONS                  JUL 1978
C                                                                       JUL 1978
      IADD(3) = 38000                                                   JUL 1978
      IF ( IPLANT .GT. 242000 ) IADD(3) = 280000 - IPLANT               JUL 1978
      IF ( IPLANT .GT. 280000 ) IADD(3) = 0                             JUL 1978
      GO TO 460
    6 IOUT(1)=0
      IOUT(2)=0
      IOUT(3)=0
      MWNO(JMONTH,INDEX)=0
      MWON(JMONTH,INDEX)=0
      MWNN(JMONTH,INDEX)=0
      GO TO 19
  450 IF(IPLANT.LE.250000)IADD(3)=30000
      IF(IPLANT.GT.250000)IADD(3)=280000-IPLANT
      IF(IPLANT.GT.280000)IADD(3)=0
C --REMOVED-- JUL 78 --  460 IF(IPLANT.GT.320000)IADD(3)=320000-IPLANT
  460  IADD(2) = -2 * IADD(1)                                           JUL 1978
      IF(IADD(2).GT.0)IADD(2) = IADD(1)
      DO 500 L = 1,3
      YFLOW = IPLANT+IADD(L)
      YTAIL = TAILW(YFLOW)
      HEAD = FORE(JMONTH,INDEX) - YTAIL
      X = OUT(HEAD,YFLOW) * 0.5
      IOUT(L) = IROUND(X)
  500 CONTINUE
      MWO(JMONTH,INDEX) = IOUT(1)
      MWN(JMONTH,INDEX) = IOUT(2)
      MWPEAK(JMONTH,INDEX) = IOUT(3)
      IF(JMONTH.EQ.2) KRS(2) = (28+LEAP(IYEAR))*24
      KRSN = KRS(JMONTH) / 3
      MWMO(JMONTH,INDEX) = IOUT(1) * KRSN * 2
```

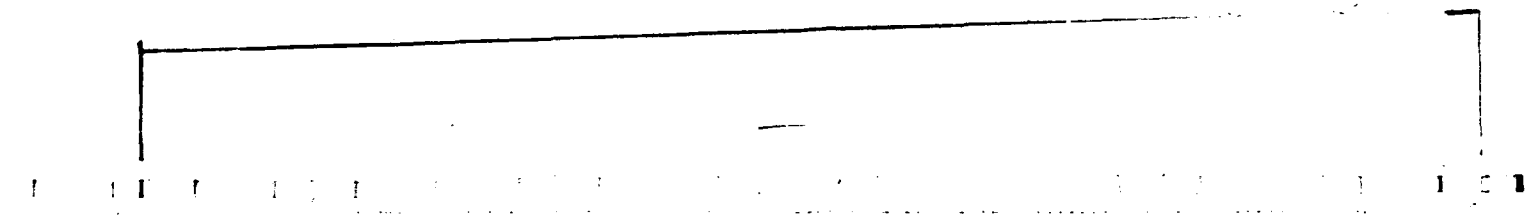
```
      MWHN(JMONTH,INDEX) = IOUT(2) * KRSN
      MLDN(JMONTH,INDEX) = (2.0*IOUT(1)+IOUT(2))/3.0
C
   19 WRITE(6,200)IYEAR,MNTH(JMONTH),ONTL(JMONTH,INDEX),FOPE(JMONTH,INDE
     *X),                                          FLOW(JMONTH,INDE
     1X),IOUT(1),MWMO(JMONTH,INDEX),IOUT(2),MWHN(JMONTH,INDEX),IOUT(3)
     2,MWDN(JMONTH,INDEX)
  200 FORMAT(1X,I4,A4,6X,F12.2,5X,F8.2,I11,1X,2(3X,I11),2(I9,5X),I6,5X,
     * I6)
      GO TO(30,30,30,20,25,30,30,30,30,30,30,30,20,27),JMONTH                  WLWM1310
   20 WRITE(6,300)                                                             WLWM1320
      GO TO 30                                                                 WLWM1325
   25 WRITE(6,310)                                                             WLWM1330
      GO TO 30                                                                 WLWM1335
   27 WRITE(6,320)                                                             WLWM1340
      GO TO 30                                                                 WLWM1345
  300 FORMAT(1H+,9X,5HD1-15)
  310 FORMAT(1H+,9X,5H16-30)
  320 FORMAT(1H+,9X,5H16-31)
C
   30 JMONTH = JMONTH + 1                                                      WLWM1370
      CALL LINECT                                                              WLWM1375
      GO TO (10,10,10,10,10,10,10,10, 5,10,10,10,10,10,10,40),JMONTH          WLWM1380
   40 JMONTH = 1                                                               WLWM1390
      JYEAR = JYEAR + 1                                                        WLWM1400
      INDEX = INDEX + 1                                                        WLWM1405
      IF(INDEX.GT.LYRS) GO TO 60                                               @NS7407
      GO TO 5                                                                  WLWM1480
   60 KKK = LYRS                                                               @NS7407
      WRITE(6,600) KKK                                                         @NS7407
  600 FORMAT(5X,'*** FATAL ERROR ***  NO. OF YEARS EXCEEDS ', I4,/)            @NS7407
      CALL EXIT                                                                @NS7407
      END                                                                      WLWM1490

@END
@END IGNORED - IN CONTROL MODE

@FIN
```

```
****** MWLYM2/            ******                                                    DATE 052881        PAGE    30

RUNID:XLERIE ACCT:AN9320       PROJ:HSTG4            MAX SUPS  00:10:00
SEND OUTPUT TO DENT-H15F3
      XLERIF FIN
PRIORITY: U    TAPEMOUNTS:   0    MAX SERVOS:  0   ACTUAL SUPS  00:00:35
  MAX CORE:  22016        MAX TRACKS:    16            CPU TIME  00:00:00
  IMAGES IN:    44  CARDS OUT:     0  PAGES OUT:    31
LAPSED MINS:   0    ARR 11:02   TERM 16:15:07 28MAY81   COST  $      .34
```

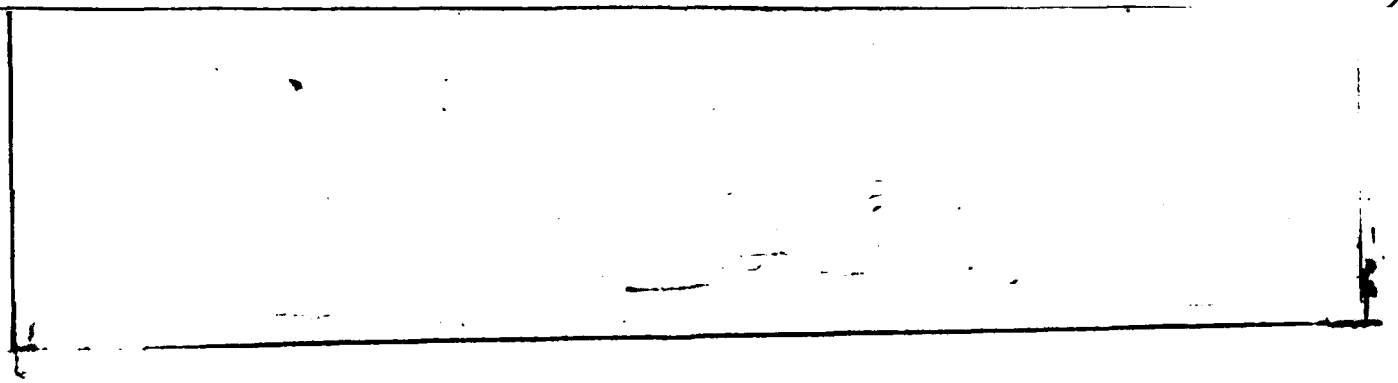
* * * * * * UNIVAC 1100 TIME/SHARING EXEC --- MULTI-PROCESSOR SYSTEM --- LEV. 1182*V52 SITE * U11-80 * * * * * *

```
XX        XX      LL              EEEEEEEEEEEE    RRRRRRRRRR          IIIIII          IIIIII
 XX      XX       LL              EEEEEEEEEEEE    RRRRRRRRRRR         IIIIII          IIIIII
  XX    XX        LL              EE              RR        RR          II              II
   XX  XX         LL              EE              RR        RR          II              II
    XXXX          LL              EE              RR        RR          II              II
     XX           LL              EEEEEEEE        RRRRRRRRRRR           II              II
     XX           LL              EEEEEEEE        RRRRRRRRRR            II              II
    XXXX          LL              EE              RR    RR              II              II
   XX  XX         LL              EE              RR     RR             II              II
  XX    XX        LL              EE              RR      RR            II              II
 XX      XX       LLLLLLLLLLLL    EEEEEEEEEEEE    RR       RR         IIIIII          IIIIII
XX        XX      LLLLLLLLLLLL    EEEEEEEEEEEE    RR        RR        IIIIII          IIIIII


DDDDDDD   EEEEEEEE  NN     NN  TTTTTTTT          KK    KK              GGGGGGG
DDDDDDDD  EEEEEEEE  NNN    NN  TTTTTTTT          KK   KK               GGGGGGGG
DD     DD EE        NNNN   NN     TT             KK  KK               GG
DD     DD EE        NN NN  NN     TT             KK KK                GG
DD     DD EE        NN  NN NN     TT             KKKK                 GG
DD     DD EEEEE     NN   NNNN     TT             KKK                  GG
DD     DD EEEEE     NN    NNN     TT             KKK                  GG
DD     DD EE        NN     NN     TT             KKKK                 GG
DD     DD EE        NN     NN     TT             KK KK                GG     GG
DD     DD EE        NN     NN     TT             KK  KK               GG     GG
DDDDDDDD  EEEEEEEE  NN     NN     TT             KK   KK               GGGGGGGG
DDDDDDD   EEEEEEEE  NN     NN     TT             KK    KK              GGGGGGG

DENT X G

* * * * * * UNIVAC 1100 TIME/SHARING EXEC --- MULTI-PROCESSOR SYSTEM --- LEV. 1182*V52     SITE * U11-80   * * * * * *


HH     HH    1   5555555  FFFFFFFF  3333333
HH     HH   11   5555555  FFFFFFFF  3333333
HH     HH  111   55       FF            33
HH     HH   11   55       FF           33
HH     HH   11   55       FF          33
HHHHHHHHH   11    55555   FFFFF      33
HHHHHHHHH   11        55  FFFFF       33
HH     HH   11        55  FF           33
HH     HH   11        55  FF            33
HH     HH   11   55   55  FF            33
HH     HH   11    55555   FF       33   33
HH     HH  1111    555    FF       3333333

H15F3

   RUNID * XLERII        USER ID * GWTP          PART NUMBER * 00      INPUT DEVICE *          OUTPUT DEVICE * PR5

     FILE NAME * PR3000XLERII          CREATED AT:   16:15:20 MAY 28,1981          PRINTED AT:   16:16:39 MAY 28,1981
```

```
1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890**SEQ NO. 64

@RUN,P     XLERIE,AH9320/GWTP,HSTG4,10,500

@LOG SEND OUTPUT TO DENT-HISF3

@ASG,A SUMMARY.
```



```
@SSG,IKE   ,HST64*SUMMARY,/Z
SSG 18R1-M2 73R1M3 05/28/81 16:15:22
```

SSG STREAM GENERATION STATEMENTS

Z	MWL2D1	1, 4
Z	MWL2C1	1, 4
Z	MWL2D1	5
Z	MWL2E1	5
Z	M3D1M1	1, 4
Z	M3D1M1	5
Z	MWL2M1	1, 4
Z	MWL2M1	5
Z	XGT	6
Z	C5	1, 1
Z	C6	1, 1
Z	C7	1, 1
Z	C8	1, 1
Z	C9	1, 1
Z	S15	1, 1
Z	S6L	1, 1
Z	N25	1, 1
Z	C10	1, 1
Z	C11	1, 1
Z	C1	1, 1
Z	C2	1, 1
Z	C3	1, 1
Z	C4	1, 1

```
SSG   REVISED   SKELETON

0001  00     *INCREMENT A FROM 1 BY 1 TO [Z]
0002  01       *IF [Z,A,3,1] <5
0003  02         #HDG  ****** [Z,A,1,1]/[Z,A,2,1] ******
0004  02         #PRT,S  HSTG4*SUMMARY.[Z,A,1,1]/[Z,A,2,1]
0005  01       *END
0006  00     *LOOP
```

```
 SSG   GENERATED OUTPUT STREAM       PART 1

000001              @HDG  ****** MWL2D1/              ******
000002              @PRT,S  HSTG4*SUMMARY.MWL2D1/
000003              @HDG  ****** MWL2F1/              ******
000004              @PRT,S  HSTG4*SUMMARY.MWL2E1/
000005              @HDG  ****** M3D1M1/              ******
000006              @PRT,S  HSTG4*SUMMARY.M3D1M1/
000007              @HDG  ****** MWL2M1/              ******
000008              @PRT,S  HSTG4*SUMMARY.MWL2M1/
000009              @HDG  ****** C5/              ******
000010              @PRT,S  HSTG4*SUMMARY.C5/
000011              @HDG  ****** C6/              ******
000012              @PRT,S  HSTG4*SUMMARY.C6/
000013              @HDG  ****** C7/              ******
000014              @PRT,S  HSTG4*SUMMARY.C7/
000015              @HDG  ****** C8/              ******
000016              @PRT,S  HSTG4*SUMMARY.C8/
000017              @HDG  ****** C9/              ******
000018              @PRT,S  HSTG4*SUMMARY.C9/
000019              @HDG  ****** S15/              ******
000020              @PRT,S  HSTG4*SUMMARY.S15/
000021              @HDG  ****** S6L/              ******
000022              @PRT,S  HSTG4*SUMMARY.S6L/
000023              @HDG  ****** N25/              ******
000024              @PRT,S  HSTG4*SUMMARY.N25/
000025              @HDG  ****** C10/              ******
000026              @PRT,S  HSTG4*SUMMARY.C10/
000027              @HDG  ****** C11/              ******
000028              @PRT,S  HSTG4*SUMMARY.C11/
000029              @HDG  ****** C1/              ******
000030              @PRT,S  HSTG4*SUMMARY.C1/
000031              @HDG  ****** C2/              ******
000032              @PRT,S  HSTG4*SUMMARY.C2/
000033              @HDG  ****** C3/              ******
000034              @PRT,S  HSTG4*SUMMARY.C3/
000035              @HDG  ****** C4/              ******
000036              @PRT,S  HSTG4*SUMMARY.C4/

END SSG      TIME =  00:03:01  HIGHEST ADDRESS =  0061552  OCTAL

@HDG  ****** MWL2D1/              ******

@PRT,S  HSTG4*SUMMARY.MWL2D1/
FURPUR 28R1.M2.6 E35 S74T11 05/28/81 16:15:23
```

```
HSTG4*SUMMARY(1),HWL2D1(1)
      1            SUBROUTINE DURAT (IYEAR1,INDEX,N1,N2)
      2      C                                                          LWD10020
      3      C              THE SUBROUTINE PRODUCES THE DURATION CURVES LWD10030
      4      C                  (1) FOR EACH MONTH FOR                  LWD10040
      5      C                            - DUMMY(NOT USED)    (A(12,100,1))
      6      C                            - DAYTIME OUTPUT     (A(12,100,2))
      7      C                            - NIGHTTIME OUTPUT   (A(12,100,3))
      8      C                            - PEAK OUTPUT        (A(12,100,4))
      9      C                            - AV. MONTHLY OUTPUT(A(12,100,5))
     10      C                  (2) FOR TOTAL ANNUAL ENERGY
     11      C                                                          LWD10100
     12      C              INPUT :  IYEAR1 - THE BEGINNING YEAR        LWD10110
     13      C                       INDEX - THE NUMBER OF YEARS        LWD10120
     14      C                                                          LWD10130
     15      C              SUBROUTINE  USED :                          LWD10140
     16      C                       DURC(TITLE,TITLE1,B,M,INDEX,NUM)   LWD10150
     17      C                                                          LWD10160
     18            COMMON /COM1/A(12,100,5)
     19            COMMON /COM4/MWHYRD(100),MWHYRN(100)
     20            COMMON /COM5/ IA(12,100,2)
     21            DIMENSION B(2,100) , TITLE(7,5),TITLE1(3,12),TITLE2(7),TITLE3(3),
     22           1M(2,100),MWHYRT(100)
     23            EQUIVALENCE (B(1),M(1))                             LWD10200
     24            DATA  TITLE/ 7*1H ,4HDAYT,4HIME ,4HENER,4HGY(P,4HV. M,4HW)  ,3HFOR
     25           1                  ,4HNIGH,4HTTIM,4HE EN,4HERGY,4H(AV.,4HMW) ,3HFOR
     26           3                  ,4HPEAK,4H OUT,4HPUT ,4H(MEG,4HAWAT,4HTS) ,3HFOR
     27           2                  ,4HAVER,4HAGE ,4HMONT,4HHLY ,4HENER,4HGY  ,3HFOR
     28           4      /TITLE2/     4HTOTA,4HL AN,4HNUAL,4H ENE,4HRGY ,4H(MWH,3H)
     29           5      /TITLE3/3*1H /
     30           6TITLE1/4HJANU,4HARY ,1H ,4HFEBR,4HUARY,1H ,4HMARC,4HH   ,1H ,4HAPR
     31           7I,4HL   ,1H ,4HMAY ,4H    ,1H ,4HJUNE,4H    ,1H ,4HJULY,4H    ,1H
     32           8,4HAUGU,4HST  ,1H ,4HSEPT,4HEMBE,1HR,4HOCTO,4HBER ,1H ,4HNOVE,4HMB
     33           9ER,1H ,4HDECE,4HMBER,1H /
     34      C                                                          LWD10310
     35      C                   PROGRAM BEGINS                         LWD10320
     36      C                                                          LWD10330
     37            DO 6 I=1,INDEX
     38            MWHYRD(I) = 0
     39          6 MWHYRN(I) = 0
     40            IYEAR1=IYEAR1-1                                     LWD10340
     41            DO 11 K = N1,N2
     42            IF(N1.NE.4.AND.K.EQ.4) GO TO 11
     43      C                                                          LWD10400
     44      C                   PRODUCE DURATION CURVES FOR EACH MONTH
     45      C                                                          LWD10431
     46            DO 16 I=1,12
     47      C                                                          LWD10434
     48      C                   PRODUCE DURATION CURVES FOR ONE  MONTH LWD10436
     49      C                                                          LWD10438
     50      C                                                          LWD10440
     51      C                   MOVE DATA AND YEARS TO ARRAY B         LWD10450
     52      C                                                          LWD10460
     53            DO 10 J=1,INDEX                                     LWD10470
     54            B(1,J)=A(I,J,K)                                     LWD10480
     55         10 M(2,J)=IYEAR1+J                                     LWD10490
     56      C                                                          LWD10500
```

```
      C              CALL SUBROUTINE TO PRODUCE DURATION CURVE          LWD10510
      C                                                                 LWD10520
        16 CALL DURC(TITLE(1,K),TITLE1(1,I),B,M,INDEX,K)                LWD10530
        11 CONTINUE                                                     LWD10531
           IF(N2.EQ.4) RETURN
           DO 30 I=1,INDEX
           DO 25 J=1,12
           MWHYRD(I) = MWHYRD(I) + IA(J,I,1)
           MWHYRN(I) = MWHYRN(I) + IA(J,I,2)
        25 CONTINUE
           MWHYRT(I) = MWHYRD(I) + MWHYRN(I)
        30 CONTINUE
           DO 40 J=1,INDEX
           IYEAR = IYEAR1 + J
           M(1,J) = MWHYRT(J)
        40 M(2,J) = IYEAR
           CALL DURC(TITLE2,TITLE3,B,M,INDEX,10)
           RETURN
           END

@HDG ****** MWL2E1/ ******

@PRT,S HSTG**SUMMARY,MWL2E1/
FURPUR 28R1.M2.6 E35 S74T11 05/28/81 16:15:24
```

```
HSTG4*SUMMARY(1),MWL2E1(1)
      1          SUBROUTINE DURC(TITLE,TITLE1,B,M,INDEX,NUM)                    WLWE0010
      2     C                                                                   WLWE0020
      3     C          THIS SUBROUTINE PRODUCES A DURATION REPORT CONTAINING    WLWE0030
      4     C                  -DATE                                            WLWE0040
      5     C                  -VALUE                                           WLWE0050
      6     C                  -ACCUMULATED TOTAL                               WLWE0060
      7     C                  -PERCENTAGE                                      WLWE0070
      8     C                  -AVERAGE VALUE                                   WLWE0080
      9     C                                                                   WLWE0090
     10     C          INPUT- TITLE - 7 WORD TITLE AT TOP OF EACH PAGE          WLWE0100
     11     C               - TITLE1- 3 WORD SUBTITLE APPENDED TO TITLE         WLWE0110
     12     C               - B(2,100) - ARRAY OF REAL VALUES AND DATES
     13     C               - M(2,100) - ARRAY OF INTEGER VALUES AND DATES
     14     C               - INDEX - NUMBER OF VALUES IN B OR M                WLWE0140
     15     C               - NUM = 1 IF INPUT IS REAL
     16     C                                                                   WLWE0160
     17          DIMENSION B(2,100),M(2,100),TITLE(7),TITLE1(3)
     18          COMMON/COM3/INDG(4)                                            WLWE0175
     19          COMMON /COM4/MWHYRD(100),MWHYRN(100)
     20          COMMON/COM5/IYEAR1,ICODE
     21     C                                                                   WLWE0180
     22     C          SET INITIAL VALUES                                       WLWE0190
     23     C                                                                   WLWE0200
     24          LINE=60                                                        WLWE0210
     25          SUM=0.                                                         WLWE0230
     26          ISUM=0                                                         WLWE0240
     27          ISUMD = 0
     28          ISUMN = 0
     29          IFIRST = IYEAR1+1
     30          ILAST = IYEAR1+INDEX
     31     C                                                                   WLWE0250
     32     C          SORT VALUES IN M(2,INDEX) IN DESCENDING ORDER            WLWE0260
     33     C                                                                   WLWE0270
     34          INDI=INDEX-1                                                   WLWE0280
     35          DO 9 I=1,INDI                                                  WLWE0290
     36          INDJ=I+1                                                       WLWE0300
     37          DO 8 J=INDJ,INDEX                                              WLWE0310
     38          IF (M(1,I)-M(1,J))6,7,8                                        WLWE0320
     39        7 IF (M(2,I).LE.M(2,J))GO TO 8                                   WLWE0325
     40        6 M1=M(1,I)                                                      WLWE0330
     41          M2=M(2,I)                                                      WLWE0340
     42          M(1,I)=M(1,J)                                                  WLWE0350
     43          M(2,I)=M(2,J)                                                  WLWE0360
     44          M(1,J)=M1                                                      WLWE0370
     45          M(2,J)=M2                                                      WLWE0380
     46        8 CONTINUE                                                       WLWE0390
     47        9 CONTINUE                                                       WLWE0400
     48          DO 10 I=1,INDEX                                                WLWE0410
     49     C                                                                   WLWE0420
     50     C          CALCULATE ACCUMULATED TOTAL AND PERCENTAGE AND WRITE LINEWLWE0430
     51     C          OF OUTPUT                                                WLWE0440
     52     C                                                                   WLWE0450
     53          LINE=LINE+1                                                    WLWE0460
     54          IF (LINE.LE.53)GO TO 5                                         WLWE 470
     55     C                                                                   WLWE0480
     56     C          COMMENCE A NEW PAGE -WRITE TITLES                        WLWE0490
```

```
      C                                                                 WLWE0500
            LINE = 8
            WRITE(6,200) IMOG,IFIRST,ILAST
        200 FORMAT (1H1,34X,61HEVALUATION OF REGULATIONS FOR GREAT LAKES LEVELWLWE0540
           1S AND OUTFLOWS,16X,944,/ 29X,72HTOTAL CANADIAN OUTPUT FOR ST LAWRE
           2NCE, ST MARYS AND NIAGARA RIVER PLANTS,11X,I4,1H-,I4/)
            WRITE (6,201)(TITLE(J),J=1,7),(TITLE1(J),J=1,3)             WLWE0560
        201 FORMAT (37X,21HDURATION LISTING FOR ,10A4/)
            IF(NUM.NE.10) WRITE(6,202)
        202 FORMAT (23X,4HYEAR,20X,5HVALUE,15X,17HACCUMULATED VALUE,11X,10HPERWLWE0590
           1CENTAGE/)                                                   WLWE0600
            IF(NUM.EQ.10) WRITE(6,106)
          5 X=I                                                         WLWE0610
            Y=INDEX                                                     WLWE0620
            PERC=(2.*X-1.)/Y*50.                                        WLWE0630
            IF(NUM.EQ.10) GO TO 20
            IF (NUM.GE.2) GO TO 2
      C                                                                 WLWE0650
      C               INPUT VALUES ARE REAL                             WLWE0660
      C                                                                 WLWE0670
          1 SUM=SUM+B(1,I)                                              WLWE0680
            WRITE (6,101)M(2,I),B(1,I),SUM,PERC                         WLWE0690
        101 FORMAT (23X,I4,17X,F8.2,18X,F9.2,17X,F6.2)                  WLWE0700
            GO TO 10                                                    WLWE0710
      C               INPUT VALUES ARE INTEGER                          WLWE0720
      C                                                                 WLWE0730
      C                                                                 WLWE0740
          2 ISUM=ISUM+M(1,I)                                            WLWE0750
            WRITE (6,102)M(2,I),M(1,I),ISUM,PERC                        WLWE0760
        102 FORMAT (23X,I4,17X,I8,17X,I10,17X,F6.2)                     WLWE0770
            GO TO 10
         20 IND = M(2,I) - IYEAR1
            ISUM = ISUM + M(1,I)
            ISUMD = ISUMD + MWHYRD(IND)
            ISUMN = ISUMN + MWHYRN(IND)
            WRITE(6,105) M(2,I),MWHYRD(IND),ISUMD,MWHYRN(IND),ISUMN,M(1,I),
           1ISUM,PERC
        105 FORMAT (11X,I4,4X, 3(I10,5X,I12,7X),F6.2)
        106 FORMAT (20X,7HDAYTIME,25X,9HNIGHTTIME,28X,5HTOTAL,/  11X,4HYEAR,
           1 3(4X,30HENERGY(MWH)  ACCUMULATED VALUE),2X,10HPERCENTAGE)
         10 CONTINUE                                                    WLWE0780
      C                                                                 WLWE0790
      C               WRITE AVERAGE VALUE AT END OF REPORT              WLWE0800
      C                                                                 WLWE0810
            IF(NUM.EQ.10) GO TO 21
            IF (NUM.GE.2) GO TO 4
          3 SIND=INDEX                                                  WLWE0830
            SUM=SUM/SIND                                                WLWE0840
            WRITE (6,103)SUM                                            WLWE0850
        103 FORMAT (1H0,105X,15HAVERAGE VALUE  ,F8.2)                   WLWE0860
            RETURN                                                      WLWE0870
          4 ISUM=(ISUM+INDEX/2)/INDEX                                   WLWE0880
            WRITE (6,104)ISUM                                           WLWE0890
        104 FORMAT (1H0,105X,14HAVERAGE VALUE ,I9)                      WLWE0900
            IF(ICODE.EQ.4HPK2 ) WRITE(6,108)
        108 FORMAT(52X,25HNIAGARA PEAK NOT INCLUDED)
            RET
```

```
   21 ISUMD = (ISUMD+INDEX/2)/INDEX
      ISUMN = (ISUMN+INDEX/2)/INDEX
      ISUM  = (ISUM +INDEX/2)/INDEX
      WRITE(6,107) ISUMD , ISUMN , ISUM
  107 FORMAT (/4X, 13HAVERAGE VALUE,2X,3(I10,24X))
      RETURN
      END                                                    WLWE0920
```

```
@HDG  ****** M3D1M1/          ******

@PRT,S  HSTG4*SUMMARY.M3D1M1/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 16:15:24
```

```
HSTG4*SUMMARY(1).M3D1M1(1)
      1       C
      2             FUNCTION LEAP(IYEAR)                                  3D100010
      3       C (UNIVAC 1100 - FORTRAN V)                                 3D100015
      4       C
      5       C FUNCTION LEAP EXAMINES THE INPUT YEAR TO DETERMINE WHETHER IT IS A  3D100020
      6       C LEAP YEAR. WHEN THE INPUT YEAR IS A LEAP YEAR A FLAG IS SET TO 1. IF 3D100030
      7       C IT IS NOT A LEAP YEAR THIS FLAG IS SET TO 0.                3D100040
      8       C
      9             ALPHA = IYEAR                                         3D100050
     10             BETA = ALPHA / 4.0                                    3D100060
     11             LAMBDA = IYEAR / 4                                    3D100070
     12             GAMMA = LAMBDA                                        3D100080
     13       C
     14             IF (BETA.EQ.GAMMA) GO TO 200                          3D100090
     15       C
     16          100 LEAP = 0                                             3D100100
     17              GO TO 400                                            3D100110
     18       C
     19          200 IF (IYEAR.EQ.1900) GO TO 100                         3D100120
     20       C
     21          300 LEAP = 1                                             3D100130
     22       C
     23          400 RETURN                                               3D100140
     24       C
     25              END                                                  3D100150
```

-298-

```
@HDG ****** MWL2M1/ ******

@PRT,S  HSTG4*SUMMARY.MWL2M1/
FURPUR 28R1.HZ.6 E35 S74T11 05/28/81 16:15:25
```

```
HSTG40SUMMARY(1),MWL2M1(7)
      1       DIMENSION IDATA(3),IDENT(5),KRS(12),IYR1(3),JYRFIN(3)
      2       DIMENSION MW(12,3,100,3),MISS(3)
      3       DATA KRS/744,672,744,720,744,720,2*744,720,744,720,744/
      4       DATA MW/10800*0/
      5       DATA IDENT/5*4H    /
      6       DATA IDATA/4HNIAG,4HSAUN,4HSTMA/
      7       COMMON/COM5/IYRS,ICODE
      8      1        /COM1/DUMMY(120),MWT(12,100,3),MWTON(12,100)
      9      2        /COM6/MWRT(12,100,2)
     10      3        /COM7/IHDGC(4)
     11   20 READ(5,25) IHDGC,ICODE,IYRS,IYRF
     12       IF(IHDGC(1).EQ.4H9999)GO TO 99
     13       IF(ICODE.NE.4HAVMW.AND.ICODE.NE.4HPK2 .AND.ICODE.NE.4HPK3 )GOTO98
     14       IF((IYRS.GT.IYRF).OR.(IYRS.GT.1989).OR.(IYRF.LT.1890))GO TO 97
     15       IF((IYRS.GT.IYRF).OR.(IYRF.GT.1989).OR.(IYRF.LT.1890)) GO TO 97
     16       DO 30 I=1,4
     17       IF(IHDGC(I).LT.IDENT(I)) GO TO 40
     18   30 IF(IHDGC(I).GT.IDENT(I)) GO TO 50
     19       GO TO 110
     20   40 REWIND 8
     21   50 L=0
     22          MISS(1) = 0
     23          MISS(2) = 0
     24          MISS(3) = 0
     25          DO 54 IX=1,3
     26          IYR1(IX) = 1890
     27   54 JYRFIN(IX) = 1989
     28          DO 58 LI=1,3
     29          DO 58 II=1,100
     30          DO 58 MI=1,3
     31          DO 58 JI=1,12
     32   58 MW(JI,MI,II,LI) = 0
     33   60 READ(8)IDENT,NYRS
     34          IF(IDENT(1).EQ.4H9999)GO TO 96
     35          DO 70 I=1,4
     36   70 IF(IDENT(I).NE.IHDGC(I))GO TO 150
     37          L = L+1
     38      C       L=1 FOR NIAGARA, L=2 FOR SAUNDERS, L=3 FOR ST MARYS
     39   80 IF(IDENT(5).EQ.IDATA(L))GO TO 90
     40          MISS(L) = 1
     41          IF((L.GT.1.AND.MISS(1).EQ.1).OR.(L.EQ.3.AND.MISS(2).EQ.1))GO TO 86
     42          WRITE(6,85)
     43   85 FORMAT(1H1)
     44   86 WRITE(6,186) IDATA(L),IHDGC
     45  186 FORMAT(10X,5HCASE ,A4,23H NOT ON TAPE FOR STUDY ,4A4)
     46          L = L+1
     47          IF(L.EQ.4) GO TO 87
     48          GO TO 30
     49   87 WRITE(6,85)
     50   88 WRITE(6,188) IHDGC
     51  188 FORMAT(10X, 37HREQUIRED CASES NOT ON TAPE FOR STUDY ,4A4,24H. SKIP
     52        1PING TO NEXT STUDY)
     53          GO TO 20
     54   90 DO 100 I=1,NYRS
     55          READ(8)IYEAR,((MW(J,N,I,L),J=1,12),N=1,3)
     56      C       N=1 FOR DAYTIME MW, N=2 FOR NIGHTTIME MW, N=3 FOR PEAK MW
```

```
      IF(I.EQ.1)JYEAR = IYEAR-1
      IF(I.EQ.1)IYR1(L) = IYEAR
      JYEAR = JYEAR+1
      IF(IYEAR.NE.JYEAR)GO TO 93
  100 CONTINUE
      JYRFIN(L) = JYEAR
C        READ DATA TAPE UNLESS ALL 3 SETS HAVE BEEN READ
  104 IF(L.LT.3)GO TO 60
      MAXYR = 1989
      MINYR = 1890
      DO 106 MAX = 1,3
      IF(IYR1(MAX).GT.MINYR) MINYR = IYR1(MAX)
      IF(JYRFIN(MAX).LT.MAXYR)MAXYR = JYRFIN(MAX)
  106 CONTINUE
  110 IF(ICODE.NE.4HPK2 .AND.MISS(1).EQ.1) GO TO 87
      IF(MISS(2).EQ.1.OR.MISS(3).EQ.1) GO TO 87
      IF(IYRS.LT.MINYR.OR.IYRF.GT.MAXYR) GO TO 92
      IF(ICODE.EQ.4HAVMW)GO TO 120
      N1 = 4
      N2 = 4
      GO TO 130
  120 N1 = 2
      N2 = 5
  130 M1 = N1-1
      M2 = 5-2*N2/3
C        SUM THE SPECIFIED OUTPUTS FOR ALL THREE PLANTS
      NSPEC = IYRF-IYRS+1
      DO 140 N=M1,M2
      DO 140 I=1,NSPEC
      JIND1 = I+IYRS-IYR1(N)
      JIND2 = I+IYRS-IYR1(N)
      JIND3 = I+IYRS-IYR1(N)
      DO 140 J=1,12
      MWT(J,I,N) = MW(J,N,JIND1,1) + MW(J,N,JIND2,2) + MW(J,N,JIND3,3)
      IF(ICODE.EQ.4HPK2 ) MWT(J,I,N) = MW(J,N,JIND2,2)+MW(J,N,JIND3,3)
      IF(N.EQ.2) MWTDN(J,I) = (2*MWT(J,I,1)+MWT(J,I,2)+1)/3
      IF(ICODE.NE.4HAVMW)GO TO 140
      IF(J.EQ.2) KRS(2) = (28+LEAP(IYRS+I-1))*24
      MWMT(J,I,N) = MWT(J,I,N)* KRS(J)*(3-N)/3
  140 CONTINUE
      DO 300 I=1,NSPEC
      WRITE(17,320)MWT(12,I,3)
  300 CONTINUE
  320 FORMAT(5X,I6)
      CALL DUPAT(IYRS,NSPEC,N1,M2)
      GO TO 20
C        READ THROUGH DATA FOR STUDY WHICH IS NOT REQUESTED.
  150 DO 160 I=1,NYRS
  160 READ(8)IYEAR,((MW(J,N,I,1),J=1,12),N=1,3)
      GO TO 60
   99 REWIND 8
      CALL EXIT
   98 WRITE(6,198)IHDGC
      GO TO 20
   97 WRITE(6,197)IHDGC
      GO TO 20
      IF
```

-300-

```
      L = L+1
      REWIND 8
      GO TO 80
   94 WRITE(6,194)IHDGC
      REWIND 8
      GO TO 20
   93 WRITE(6,193)IHDGC,IDATA(L)
      CALL EXIT
   92 WRITE(6,192) IHDGC,MINYR,MAXYR,IYPS,IYRF
      GO TO 20
   25 FORMAT(5A4,2I4)
  198 FORMAT(1H1, 9X,43HCONTROL CODE SPECIFIED IS INCORRECT. STUDY ,4A4,
     117H HAS BEEN SKIPPED)
  197 FORMAT(1H1, 9X,43HYEAR LIMITS SPECIFIED ARE INCORRECT. STUDY ,4A4,
     117H HAS BEEN SKIPPED)
  194 FORMAT(1H1, 9X,6HSTUDY ,4A4,52H NOT FOUND ON THE DATA TAPE. SKIPPI
     1NG TO NEXT STUDY.)
  193 FORMAT(1H1, 9X,    34HINPUT TAPE OUT OF ORDER FOR STUDY ,4A4, 9H F
     1OR THE ,A4,19H CASE. RUN ABORTED.)
  192 FORMAT(1H1, 9X,6HSTUDY ,4A4,22H IS ON TAPE FOR YEARS ,I4,4H TO ,I4
     1,  32H. REQUEST FOR THE STUDY BETWEEN ,      I4,5H AND ,I4,18H HAS
     2 BEEN SKIPPED.)
      END
```

@HDG ****** C5/ ******

```
@PRT,S  HSTG4*SUMMARY.C5/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 16:15:25
```

-301-

```
****** C5/              ******                                                    DATE 052881        PAGE    15

HSTG4*SUMMARY(1).C5(29)
     1       R-5              PK3 19001976
     2       R-5              AVMW19001976
     3       9999

@HDG  ****** C6/              ******

@PRT,S  HSTG4*SUMMARY.C6/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 16:15:25
```

****** C6/ ****** DATE 052881 PAGE 16

```
HSIG4*SUMMARY(1).C6(30)
      1       R-6             PK3 1*0001976
      2       R-6             AVMW19001976
      3       9999

@ADD ****** C7/ ******

@PRT,S  HSIG4*SUMMARY.C7/
FURPUR 28R1.M2.6 E35 S74T11 05/28/81 16:15:26
```

```
****** C7/              ******                                                    DATE 052881        PAGE    17

HST64*SUMMARY(1).C7(31)
     1       R-7              PK3 19001976
     2       R-7              AVMW19001976
     3       9999

@HDG  ****** C8/              ******

@PRT,S  HST64*SUMMARY.C8/
FURPUR 28R1.H2.6 E35 S74T11 05/26/81 16:15:26
```

```
****** C8/              ******                                                    DATE 052881        PAGE    18

HSTG4*SUMMARY(1).CJ(32)
     1       R-6              PK3 19001976
     2       R-8              AVMW19001976
     3       9999

@HDG  ****** C9/              ******

@PRT,S  HSTG4*SUMMARY.C9/
FURPUR 28R1.H2.6 E3S S74T11 05/28/81 16:15:26
```

-305-

```
HSTG4*SUMMARY(1).C9(32)
     1       R-9              PK3 19001976
     2       R-9              AVMW19001976
     3       9999

@HDG ****** S15/ ******

@PRT,S  HSTG4*SUMMARY.S15/
FURPUR 28R1.M2.6 E35 S74T11 05/28/81 16:15:27
```

```
HSTG4*SUMMARY(1).S15(32)
     1       SE015S2 CAT1    PK3 19001976
     2       SE015S2 CAT3    AVMW19001976
     3       9999

@HDG  ****** S6L/          ******

@PRT,S  HSTG4*SUMMARY.S6L/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 16:15:27
```

```
****** S6L/              ******                                                    DATE 052881        PAGE    21

HSTG4*SUMMARY(1).S6L(34)
     1       SE06L CAT3       PK3 19001976
     2       SE06L CAT3       AVMW19001976
     3       9999

@HDG  ****** N25/              ******

@PRT,S  HSTG4*SUMMARY.N25/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 16:15:27
```

```
HSTG4*SUMMARY(1).N25(33)
     1       NRS CAT3          PK3 19001976
     2       NRS CAT3          AVMW19001976
     3       9999

@HDG ****** C10/ ******

@PRT,S HSTG4*SUMMARY.C10/
FURPUR 28R1.M2.6 E35 S74T11 05/28/81 16:15:28
```

```
****** C10/              ******                                                    DATE 052881        PAGE    23

HSTG4*SUMMARY(1).C10(32)
     1       R-10              PK3 19001976
     2       R-10              AVMW19001976
     3       9999

@HDG  ****** C11/              ******

@PRT,S  HSTG4*SUMMARY.C11/
FURPUR 2@R1.H2.6 E35 S74T11 05/28/81 16:15:30
```

```
HSTG4*SUMMARY(1).C11(32)
     1      R-11            PK3 19001976
     2      R-11            AVMW19001976
     3      9999

@MDG  ****** C1/             ******

@PRT,S  HSTG4*SUMMARY.C1/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 16:15:31
```

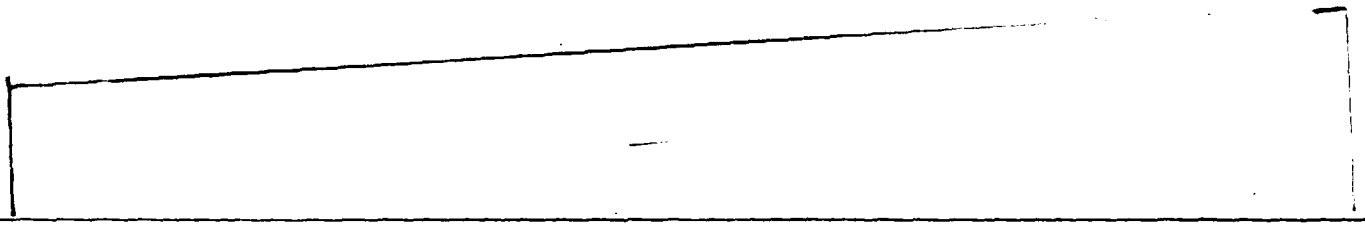
```
****** C1/              ******                                                    DATE 052881        PAGE    25

HSTG4*SUMMARY(1).C1(37)
     1       BASE CASE CAT1  PK3 19001976
     2       BASE CASE CAT1  AVMW19001976
     3       9999

@HDG  ****** C2/              ******

@PRT,S  HSTG4*SUMMARY.C2/
FURPUR 28R1.H2.6 E35 S74T11 05/28/81 16:15:32
```

```
****** C2/              ******                                                    DATE 052881        PAGE    26

HSTG4*SUMMARY(1).C2(33)
     1       SE06L CAT3       PK3 19001976
     2       SE06L CAT3       AVMW19001976
     3       9999

@HOG  ****** C3/              ******

@PRT,S  HSTG4*SUMMARY.C3/
FURPUR 26R1.H2.6 E35 S74T11 05/28/81 16:15:33
```

****** C3/ ****** DATE 052881 PAGE 27

```
HSTG4*SUMMARY(1).C3(32)
     1       NRS CAT3          PK3 19001976
     2       NRS CAT3          AVMW19DC1976
     3       9999

@HDG ****** C4/ ******

@PRT,S  HSTG4*SUMMARY.C4/
FUNPUR 28R1.H2.6 E3S S7*T11 05/28/81 16:15:34
```

```
MSTG4*SUMMARY(1).C4(3)
     1       SE015S2 CAT3    PK3 19001976
     2       SE015S2 CAT3    AVMW19001976
     3       9999

@END
@END IGNORED - IN CONTROL MODE

@FIN
```



****** C4/ ****** DATE 052881 PAGE 29

RUNID:XLERIE ACCT:AN9320 PROJ:HSTG4 MAX SUPS 00:10:00

SEND OUTPUT TO DENT-H15F3

XLERII FIN

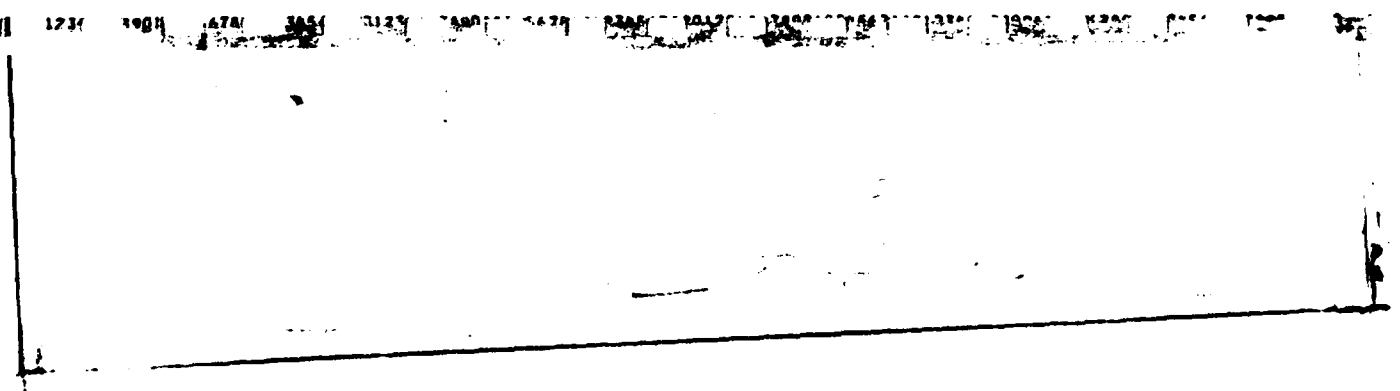
PRIORITY: 0 TAPEMOUNTS: 0 MAX SERVOS: 0 ACTUAL SUPS 00:00:36

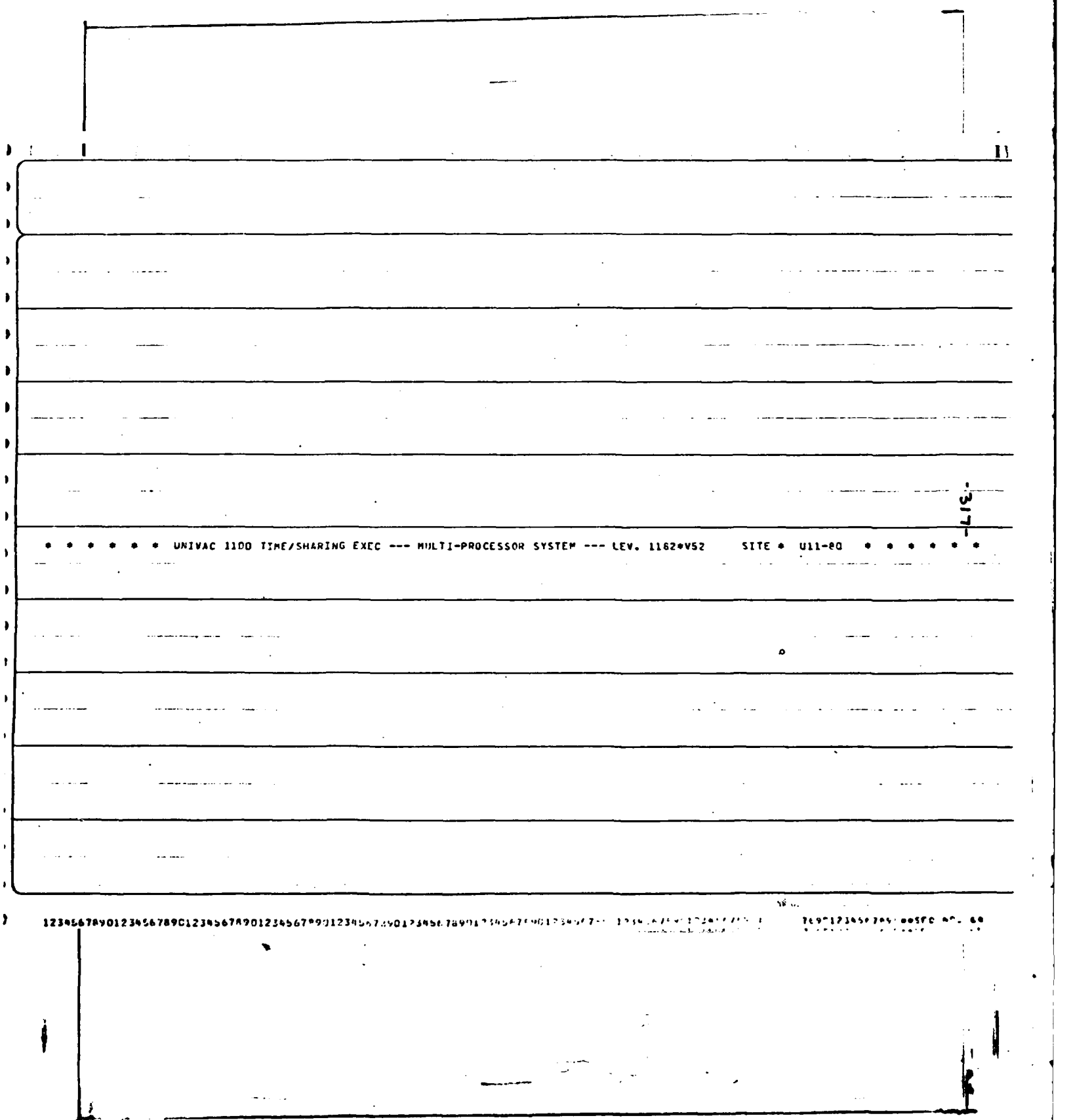
MAX CORE: 22016 MAX TRACKS: 16 CPU TIME 00:00:00

IMAGES IN: 50 CARDS OUT: 0 PAGES OUT: 30

LAPSED MINS: 0 ARR 11:04 TERM 16:15:35 28MAY81 COST $ .35

-316-

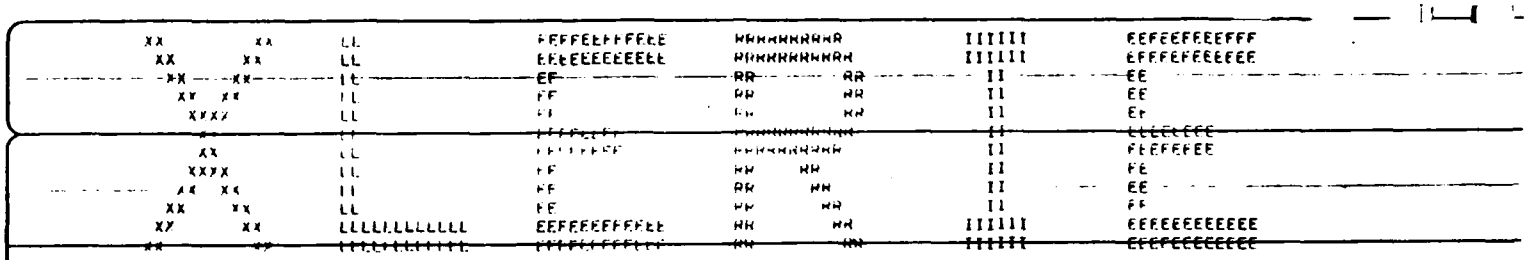



* * * * * * UNIVAC 1100 TIME/SHARING EXEC --- MULTI-PROCESSOR SYSTEM --- LEV. 1162*V52 SITE * U11-80 * * * * * *
1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

SECTION 4.0

SAMPLE INPUT

The sample input listed here is the input required to run the Lake Erie Regulation Study Base Case. For a description of the data Section 2.1, 2.2, 2.3 and 2.4.



3/9

* * * * * * UNIV4C 1100 TIME/SHARING EXEC --- MULTI-PROCESSOR SYSTEM --- LEV. 1182*V52 SITE * U11-80 * * * * * * *

RUNID * CLERIC PART NUMBER * 00 OUTPUT DEVICE * RMSP15

FILE NAME * BASF-1 NON-STANDARD PRINT FILE PRINTED AT: 14:41:44 JUN 11,1981

1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890**SEQ NO. 03

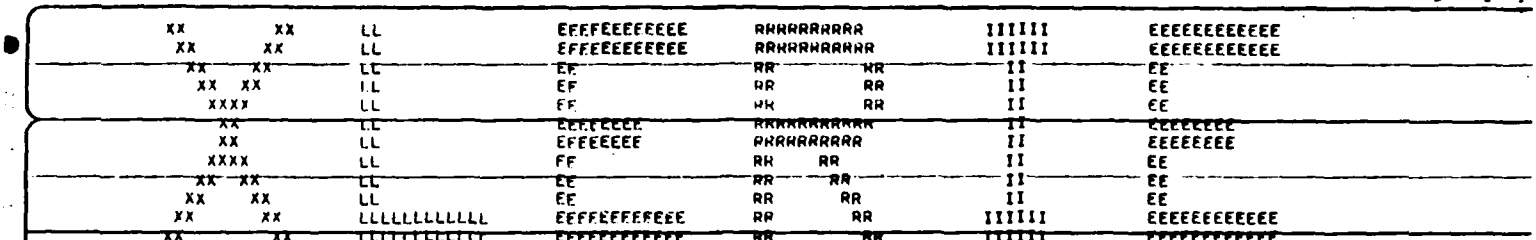
BASE	CASE	CAT1
1900		577445774757757577715777657815578415786657871578b957866574 3
1901		57 1155780457215785957#4857957857857857857857857857857857824
1902		57
1903		5778857793574165784357
1904		57821578125742578455793157963579857965795579285790157866
1905		57842579357
1906		57
1907		57963578657947357895791457
1908		57
1909		57793577925778
1910		57811578
1911		57739577395773857751577
1912		57759577565775857774578345787757887578945789657
1913		57833578225784578769256795057956579495792757906578957878
1914		57
1915		57717577925773
1916		57748577945778
1917		57
1918		57897577
1919		57913578957
1920		57
1921		57840578957838578795793857911579045784905787657857257825780
1922		57794577
1923		57766577485779157775735155784057843579315781657795775766457737
1924		57716577
1925		57670576857567567857678436578957678435765557627576025758
1926		57
1927		57672576755764935771957757757935781057904577995777857771577
1928		57755577555776957800578535788457904579145791657942257936579
1929		57930579256793957993588585899658100588035804855900957973579
1930		57919579235793157933579585794857994579805794257899578575782
1931		57792577725777657776577445779557792577675775357740577285771
1932		57
1933		57665576615765957685577395777157773577515771957692576657648
1934		57644576365763057653576765769057693576457605576057649576
1935		57644576655768057683578935771457731577255770857844576695765
1936		57647576505766057679577057877265772557717577135770157671576
1937		57636576305743557651576885771457725577225771257695578057661
1938		57
1939		57729577245773557759577445702857842578425783057804577755774
1940		57722577075769657700577285776357782577867781577575773457724
1941		57718577135770257714577385774757748577345772557739577545775
1942		57741577385775657784578175785257463578485782857812577985778
1943		57730577855790557835578775793357970757977579615792857900578
1944		57
1945		57747577765778557809578445748857911579055789557845784
1946		57840578445784615747857849579075790957884578605783357805577
1947		57767577605775757793578585790557925857927579125784957867757829
1948		57796577845780257839578695788757857869578345778657758577
1949		57730577285772457741577605774057795577825775157719576915767
1950		57
1951		57777577857590857862579135792357955796957961579588796457960
1952		57961579625794557990580345805058069587858057584003579575793
1953		57916579035790757927579515797957995579935797257939579055786
1954		57841578335784157867579035793857906257957579455795057951579
1955		57903578857

1956	577675776257766577875782457852578635786957851578145778157756
1957	577375772457721577355776557795578165781157787577645774457736
1958	577315772357715577185772057720577275772057705576455765557626
1959	[illegible]
1960	577315773557735577655783757491579125791457894578565782857800
1961	577665775057753577705774757802578135780857802577905776657742
1962	577265772657734577535777757793577915778057760577325769857662
1963	576345762057629576515767657691576965769557680576545762457591
1964	575685755457546575625759257610576205762057613575945757457560
1965	[illegible]
1966	576865768257700577235774557757577565774157716576845767657687
1967	576905768857691577315777557808578275781657795577735776157761
1968	577585775257753577715779657823578435785157858578475782857819
1969	578165781457811578345787857922579545795357921578935787657853
1970	578365782657818578345786857899579235792257915579095789057881
1971	[illegible]
1972	578935787657878579075794757970579845800458015580035798557974
1973	579725796757984580225806558105581165811258090580575802757998
1974	[illegible]
1975	579665796257971579915802358052580615805358032579915796057946
1976	579305792957964580095804258061580625803857992579415789857856
1999	
190001	60136 829060116 823560098 818660092 817060102113896010011372
190007	6011011042601401160960178121506019312308601691205860132 8277
190101	60095 817960066 809960050 805660053 806560064 985460086 8639
190107	6011710228601261163160111 957360103 8198600891086160059 7012
190201	60030 698760008 696859996 695860002 696360025 799260053 8065
190207	60071 811460077 702360081 672360082 703260078 860760082 7015
190301	60038 699460007 696759994 695660010 697060054 806760085 10001
190307	60097 908260109 988060113 916060111 915160094 947460061 7014
190401	60028 698560012 697260003 696459999 696160027 698460066 7018
190407	60091 703260098 673160119 770760131 9246601161152460080 7030
190501	60046 700160024 698260025 698360037 699360060 891460092 8659
190507	60118 873560135 971060146 1182360137 1173460116 1122860095 7663
190601	60068 761560048 757960030 754660031 754860057 853060088 8159
190607	60108 871960111 822060111 822260104 820260092 816860072 7024
190701	60050 700560035 699160029 698660027 698560050 805860087 8640
190707	60104 870460126 826060146 1167260137 1173960105 1141860064 6719
190801	60029 670660010 669959996 669459997 669460037 699360088 7651
190807	60113 874460116 1042860137 705560055 704460069 550060042 6711
190901	60018 670259998 669559984 669059982 668960014 697360042 7568
190907	60064 671960088 765160090 765360082 713260077 812960069 7616
191001	60046 757660020 752959999 749360000 749560014 751860022 6980
191007	60027 670560038 550060044 550060034 550060019 550059993 5500
191101	59965 550059945 550059927 550059922 550059949 550059991 6692
191107	60030 670660060 808360059 895760060 928260040 550060023 6704
191201	60002 669659982 668959972 668659987 669160018 839260044 7572
191207	60042 760460077 702760085 703560084 550060070 550060048 5500
191301	60022 550059995 550059998 550060023 550060056 907260081 8140
191307	60102 819660120 876460130 923860128 1165060114 1150660090 7654
191401	60058 759660022 755160011 751460014 752060045 804560071 8114
191407	60088 815960098 818560101 767560092 816860074 872360043 8998
191501	60016 697560005 696559980 694559975 694059998 749060035 7556
191507	60066 894260071 858460086 764860101 1031160098 1134860087 8[illegible]0
191601	60069 857560048 850060030 843660053 851760107 1052560147 11839
191607	6016211994601611197860164120136016011967601311167560104 7680
191701	60077 763160049 758160044 757160046 757560058 807860084 7644

191707	60100	850468112	550060123	706960116	706260099	550060073	6722
191801	60048	671360032	670760015	670160012	670060042	699760076	8989
191807	60035	704460108	705560109	705760114	550060119	82360109	8216
191901	60047	815					8974
191907	60078	672460079	550060079	550060072	550060046	550060056	5500
192001	60037	550060027	550060038	550060065	550060046	101966010	810168
192007	60127	105	126	162	107	471	7718
192101	60037	670560007	669859995	664460013	670060048	8052	8096
192107	60071	762060076	762960071	672160057	550060030	550059996	5500
192201	60046	550060059	550060059	550060045	550060020	550059995	5500
192301	59972	550059947	550059932	550059937	550059951	667859966	5500
192307	59945	550060000	550060005	550060005	550059997	550059978	5500
192401	59954	550059930	550059910	550059914	550059929	550059940	5500
192407	59966	550059981	550060010	550060000	550059943	550059952	5500
192501	59976	550059905	550059944	550059904	550059920	550059941	5500
192507	59964	550059975	550059992	550059975	550059949	550059923	5500
192601	59900	550059879	550059869	550059870	550059885	550059917	5500
192607	59943	550059979	550060005	550060021	743160018	9727600	6699
192701	59991	669259977	668759940	664860003	669760045	98926008	110791
192707	60103	109	107	144	009	411	6708
192801	60016	670					8120
192807	60106	954160	125	102	900	137	7676
192901	60076	753060	062	760360059	759960070	761760	8110
192907	60107	673560	114	822960114	550060117	550060108	5500
193001	60063	671560	046	671260032	670760028	670560049	7586
193007	60112	101	361	122	822360103	705	7045
193101	60079	672					8961
193107	60018	670260	022	694060023	550060032	550060045	6992
193201	60005	694					8388
193207	60033	755360	054	884560049	946960018	670260002	5500
193301	59961	668	044	667	668	667259974	7450
193307	60019	697	022	698060023	670460023	698160010	7512
193401	60049	697					8906
193407	60011	836	013	796260027	756	760	9376
193501	59990	829459968	821759957	814159971	822959990	915760015	8711
193507	60044	919	056	102	042	970	6961
193601	59980	694	967	694	978	693	8346
193607	60043	101	039	881	035	879	9346
193701	59988	553					8310
193707	60045	920	013	126	052	103	9355
193801	59979	694459963	693159959	692759940	695360032	940660066	9612
193807	60095	105	100	100	100	100	7562
193901	60121	753160008	750960000	744460009	751060043	947460089	10380
193907	60114	112	120	112	112	560	6702
194001	60071	800					7550
194007	60046	885360045	804560034	670460021	550060011	550060000	5500
194101	59979	550059957	550059939	550059957	550059995	831060018	7974
194107	60033	879	039	802	958	863	6991
194201	60012	697159949	695259979	694459991	695360025	799360051	8873
194207	60041	760260073	811760074	812060074	702560070	989660049	7004
194301	60029	894					8691
194307	60131	169	760	133	154	460	6717
194401	60025	670459999	669559942	668959985	669060019	752760071	8116
194407	60111	957	268	131	109	066	7549
194501	60029	754660016	752260025	753860053	758	860	10001
194507	60096	867460107	871460109	956060094	817640079	550060062	7015

194601	60041	699660027	699660027	699460038	699660051	8987260070 8112
194607	60036	8153660047	8156660090	765560095	9482600821119560055	7591
194701	60025	753959998	749259978	745859989	747660029	8003600082 8143
194707	60113	699660118	8742659118	916560101	8693600179	8729600051 6714
194801	60022	673359997	669459991	668960009	669960041	8982960046 7574
194807	60054	700860068	702060066	761060043	550060033	5500600022 6704
194901	60001	669459982	668459966	669959988	669459993	7482960025 7993
194907	60055	8072660064	9601860050	850660044	7572600301045260003	6964
195001	59982	694759964	693159953	692259965	693260020	7529600H010312
195007	60111	7484601251	1016860121	1157860131	1498601041	1407600881 8820
195101	60049	850460034	845060035	845260058	8536600961027060124	10659
195107	6013911753601451	1822601551	1923601551	1914601361	173260114	7699
195201	60095	7864600?8	7625860058	7592860068	7614600H71036660105	9123
195207	6014210629601631	1526601521	0886960115	8231600884	550060066	5500
195301	60047	550060035	550060032	550060050	5500600H9100296013111232	
195307	6015911930691651	2016601331	1900601222	1151860091	8186600849	6721
195401	60048	671360032	670760019	670260034	670960085	942360126 10864
195407	6013711732601231	1596860110	769160100	704860088	550060066	5500
195501	60038	550060017	550060010	550060032	550060063	8555600751 8125
195507	60046	764860098	8186600?5	8670600?5	863360077	937960055 7591
195601	60027	754260302	749959975	745259969	744259998	695960029 6986
195607	60052	700660008	702360064	672060055	550060039	5500600021 6703
195701	59993	669359969	668459961	664259977	668760003	8337600251 7538
195707	60047	757760050	758260046	700160035	550060026	550060013 6700
195801	59990	669259970	668559952	667959951	667859960	742559977 6687
195807	60004	696560023	694160031	754860024	748960010	697059990 6953
195901	59961	692959939	691159925	690059928	690259961	692959998 7491
195907	60011	7514601134	8991460062	9291600621	1009600361	0739600084 8897
196001	59934	669059962	668259941	667559958	668160013	751760049 8056
196007	60064	701660073	702460074	550060064	550060057	550060038 6709
196101	60006	669859990	669259937	668159996	668960018	8390600341 8451
196107	60041	756660036	699460039	550060045	550060037	550060019 6702
196201	59992	669359973	668459965	668359965	668359992	748160017 7972
196207	60023	699160033	699960041	671060031	699760005	5500599?9 5500
196301	59959	550059944	550059940	550059956	550059976	883360001 7931
196307	60019	905960020	747860018	752560005	698659940	550059965 6683
196401	59939	667459918	666759897	666059910	666459958	846559998 9550
196407	60010	9918601017	9524600251	0308600151	0566599941	0368594972 7447
196501	59947	743959927	737159917	735459926	736959965	783959998 9201
196507	60010	8684960021	8403600?4	8794600?8	9669600?3	9965600?3 7987
196601	60003	793559982	788359977	787159991	790460016	930660034 9644
196607	60041	8827600?4	8521600501	0233600?5	8454600211	0622599?9 6695
196701	59983	669059970	668559961	668259985	669960018	903260033 8016
196707	60053	806660062	760460054	806960044	550060037	670960014 6701
196801	59990	669259966	668359957	668059984	669060?19	8394600?6 8072
196807	60104	1013601331	1894601491	1454601561	1913601301	1668601?1 8193
196901	60091	8168660080	813660060	808360069	8107600951	0915601071052?
196907	60113	958260120	824560114	916360095	81776007?	550060055 6716
197001	60033	670760017	670160002	669660011	669960055	8526600901 0035
197007	60108	955260112	990460106	820760111	705860114	991760103 8198
197101	60076	812660060	808560059	808060070	8110601041	0990601311 1676
197107	60134	1175160136	1170860126	8748601?9	8289601241	1173601?2 8195
197201	60080	813760062	808960053	806560064	8096600911	0394600108 10709
197207	60123	8776601451	0117036016	1119860143	1116960120	824660101 7049
197301	60076	702760055	700860055	700960073	7024600971	0446601?210268
197307	6013610367401	8101336014	8	932560137	708260124	550060102 6733
197401	60081	672560064	671960047	671360058	6717600891	0216601?0 9929

```
197407    60140106136015410722601511048360139 774560134 550060120 7710
197501    60102 767660089 765260073 762360068 761560086103556011110183
197507    60123102736011 5 874660108 550060099 550060099 550060095 6730
197601    60071 872160053 871560092 871560076 872360094105[illegible]360102 9110
197607    60111 957360104 550060084 550060056 550060027 550059996 5500
9999
```

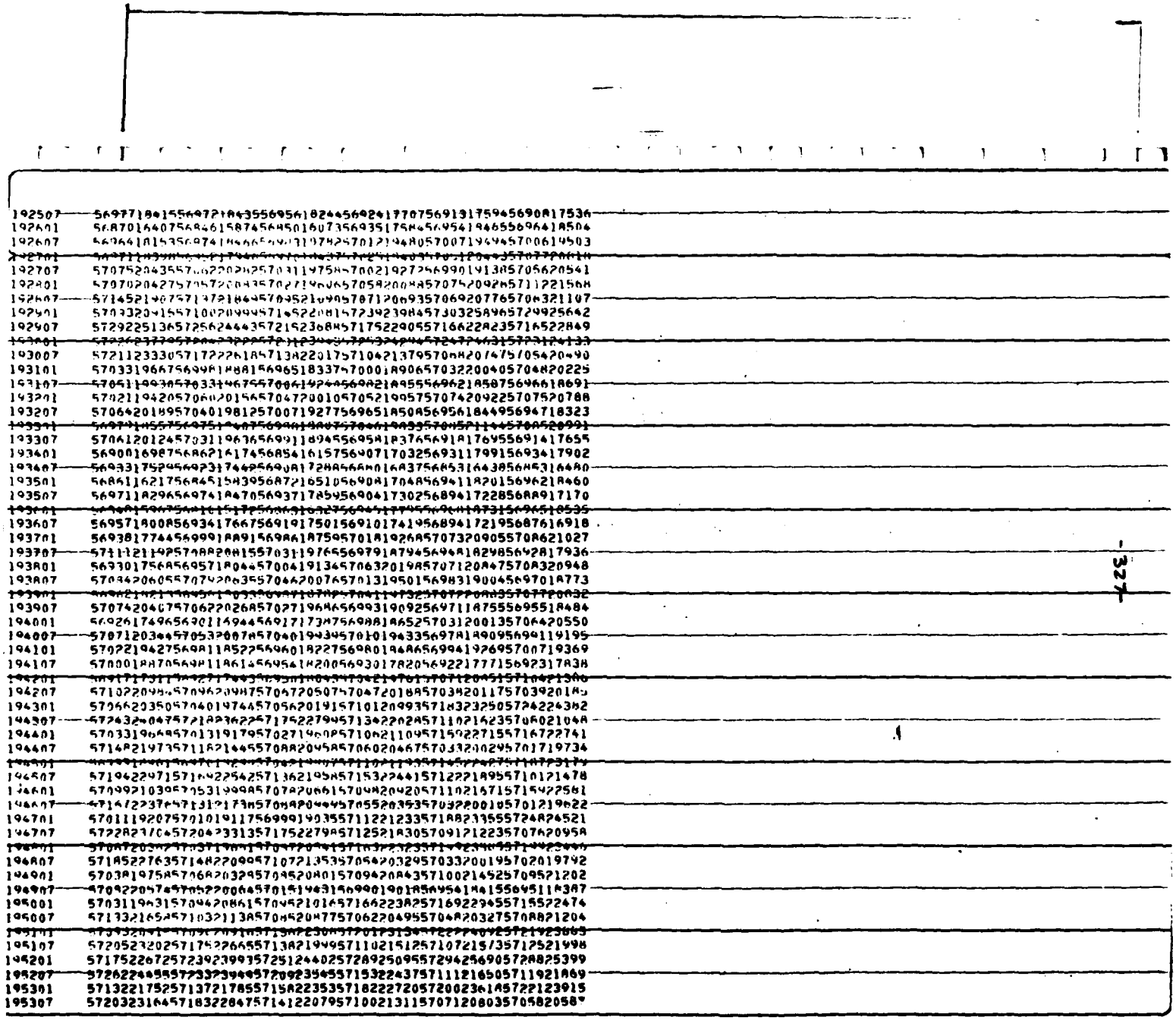


• • • • • • UNIVAC 1100 TIME/SHARING EXEC --- MULTI-PROCESSOR SYSTEM --- LEV. 1182•V52 SITE • U11-80 • • • • • •

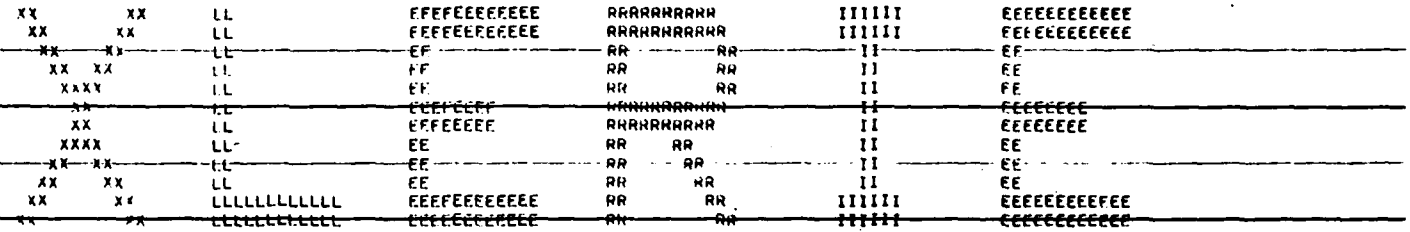
RUNID • XLERIC PART NUMBER • 00 OUTPUT DEVICE • RMSP15

FILE NAME • BASE-2 NON-STANDARD PRINT FILE PRINTED AT: 14:42:11 JUN 11,1981

```
 BASE CASE-CAT1
2 1 1 1 12 1 5000
50600 50600 50600 100600 100600 100600 100600 100600 100600 100600 100600 50600 50600
50600 50600 50600 50600 50600 50600 50600 50600 50600 50600 50600 50600 50600
-3100 -2800 -3500 300 4100 4500 4400 4500 4200 4100 3400 -1200
561. 561. 561. 561. 561. 561. 561. 561. 561. 561. 561. 561. 561.
190001 [illegible]
190007 [illegible]
190101 [illegible]
190107 [illegible]
190201 [illegible]
190207 [illegible]
190301 [illegible]
190307 [illegible]
190401 [illegible]
190407 [illegible]
190501 [illegible]
190507 [illegible]
190601 [illegible]
190607 [illegible]
190701 [illegible]
190707 [illegible]
190801 [illegible]
190807 [illegible]
190901 [illegible]
190907 [illegible]
191001 [illegible]
191007 [illegible]
191101 [illegible]
191107 [illegible]
191201 [illegible]
191207 [illegible]
191301 [illegible]
191307 [illegible]
191401 [illegible]
191407 [illegible]
191501 [illegible]
191507 [illegible]
191601 [illegible]
191607 [illegible]
191701 [illegible]
191707 [illegible]
191801 [illegible]
191807 [illegible]
191901 [illegible]
191907 [illegible]
192001 [illegible]
192007 [illegible]
192101 [illegible]
192107 [illegible]
192201 [illegible]
192207 [illegible]
192301 [illegible]
192307 [illegible]
192401 [illegible]
192407 [illegible]
192501 [illegible]
```



```
195401  5704861992A97038196959704720A535716972249759719623615971R023023
195407  5716022238571392190A571152151357134220245715022485571417234 4
195501  571702254757146214745720232A45722523674572252415457205235 9
195507  5717722595571571722174571142149857106021109377632083857045205 6
195601  5701819356569651820757024195785708520653571682291357186231 5
195607  5717722564571682251657134220457085209935704020168570312002 5
195701  5701719329570111915057029104A8970942084675712722042971322199 4
195707  5715422094571152139357079207695703820004570091952557073190 3
195801  5703114632564777184445697918A1956999188725701119617570221 A0
195807  5714617777470611746170141746276787184784A6A4A2935857717874
195901  5691217217563481786756947187745704319773570762095257069206 0
195907  5704419746570141936856985148A2956977187684569671A4A856911919 8
196001  5702719930570381944857033197168708120568571152177057144222 6
196007  5714921990571382168857104213325705620381570171969456990191 4
196101  5A9751848254970183066703A19782570902076857160227515715322441
196107  5713621684712221424470721204944704020944704114944054471411 3
196201  5695918163569531797356904314700570261443057034200915704120087
196207  5703219529570171933656996188435947314A4A5695614A4D2569461A284
196301  5691717313568864168656911737105690831856156499194354569951913 2
196307  5697518361549621A823256931277a756A9941717756A731492a56A541A4YJ
196401  5A8451591654A34157195636A164165493017494569631A630569591A40A
196407  5A9681779A8492617519A9902171719A9941A37A9A4721A02098A771A9T0
196501  5695016014568671A2745692217473569571803756943190394569A118A55
196507  5A547182005695017892569371743535691317581564101755156922178 7
196601  5696217820569451784756990184695701219132570442029435705220305
196607  5704319763570251951356994191012569A11A0395694114154569911 4251
196701  5694418A655689A184765700314116570572004157092213025709221136
196707  5703320795570722063757071943A9702219569957011796975703420168
196801  5715220065570A72070957049207465711521284571162180157137220 6
196807  5716321A6857128216568570972114157059204475704020178570612 0A34
196901  5707220465571082117057095210215715322103572042370257232241 0
196907  5725024200572262374857170227025712321797570922120057046213 3
197001  5704920001570391970757055201755710521069571362221757150223 2
197007  5715622154571402143057115215245711052140857095213097103215 8
197101  5709320920570892076757142220175716022245571672286257182230 8
197107  5716622355571502212757149222505715822548571192182857114217 8
197201  5712221537571112122957145221395719327960572342835357241243 0
197207  5724924168572302347357213236345720223484572147286857239244 1
197301  5724924265724724171572772497657330260145733326574573602704 4
197307  5736926631573202547757127429A0572342965721023787972142390 8
197401  5722A2382554726324527573092569457334262195734626869573A826 1
197407  5732625893572892519457246243675720523561571962347757213238 3
197501  5722A2382257246124043572812505257745250025720025604573002568 0
197507  5728324934572642462957268245557233241795720323625572022365 2
197601  5719523089572002314457307254435731525676573222632857309258 2
197607  5730625442572802498257232240815719923338571432233857104210 8
```



```
XX        XX    LL              EEEEEEEEEEEE    RRRRRRRRRR          IIIIII      EEEEEEEEEEEE
 XX      XX     LL              EEEEEEEEEEEE    RRRRRRRRRRR         IIIIII      EEEEEEEEEEEE
  XX    XX      LL              EE              RR        RR          II        EE
   XX  XX       LL              EE              RR        RR          II        EE
    XXXX        LL              EE              RR        RR          II        EE
     XX         LL              EEEEEEEE        RRRRRRRRRRR           II        EEEEEEEE
     XX         LL              EEEEEEEE        RRRRRRRRRR            II        EEEEEEEE
    XXXX        LL              EE              RR    RR              II        EE
   XX  XX       LL              EE              RR     RR             II        EE
  XX    XX      LL              EE              RR      RR            II        EE
 XX      XX     LLLLLLLLLLLL    EEEEEEEEEEEE    RR       RR         IIIIII      EEEEEEEEEEEE
XX        XX    LLLLLLLLLLLL    EEEEEEEEEEEE    RR        RR        IIIIII      EEEEEEEEEEEE
```

* * * * * * UNIVAC 1100 TIME/SHARING EXEC --- MULTI-PROCESSOR SYSTEM --- LEV. 1182*V52 SITE * U11-80 * * * * * *

RUNID * XLERIE PART NUMBER * 00 OUTPUT DEVICE * RMSP15

FILE NAME * BASE-3 NON-STANDARD PRINT FILE PRINTED AT: 14:42:30 JUN 11,1981

123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890**SEQ NO. 01

900	244292443824452245212455724576245952460424585245042445424458
901	244222439724389245152456424574245552452224484244212437224376
902	243912437424431244872450624549246292461824535244592439924362
903	243[illegible]
904	243092433824396245372460624636246272458024510244442437124326
905	243282430424314244282450524564245912457124509244352437624364
906	244002441824397244292446624516245532453024466244252440624377
907	244262444024417244582449824538245542454124485244462441324384
908	244302444224467245402460224616245932454724457243942434724314
909	243042433024373244412455924580245392452224453024393243[illegible]
910	243432435624412244622452824550245432452624487244352437724350
911	243362434624359244272450524551245682454324515244902445124430
912	244302441024401244982458824643246112455324503244592441824389
913	244422448924474245812460524606245752452924468244142438524363
914	243582437324367244712453824553245382450824482244232436624330
915	243252436124393244112448124495245112455124526244072439124354
916	243902441224404244912456624646246532456424466243962436124347
917	243522435924397245122453524577246162457724501244372441124376
918	243552435324416244782448624500245132449324468244352440924377
919	243992440124407244632455424615245852452224459244062437324349
1920	243342432024335244192448824522245622456924522244642441124406
1921	244262441824438244902451924527245232449124451244192439324378
1922	243672436924408245022455924572245862453224467244062435424313
1923	243102430624337244262450424582245892455924516244652443324430
1924	244312443324419244762455624583245732454424483244422436924321
1925	242892428824372244302445124462244592444224411243742436924369
1926	243292430224291243782448024510245152450624498244802446224439
1927	244102438924401244322444924503245312452824484244462441524462
1928	245172453224513245512457224578245992458124506244402440724397
1929	244162444724460245712466024671246502459424517244522440524373
1930	244312450224561246002460824604245942452624461243972434824333
1931	243242431524324243852445724521245292450724474244352440624392
1932	244292448124486245402457324570245762457024523244792446324433
1933	244352442624436245302458824594245842455424519244622440924389
1934	243852436624353244172447924495245012446324428243982435624324
1935	243062428724288243242437424425244662444824404243582433424307
1936	242702422324261244252449724505244852444224409243812436524330
1937	243542440324409244442453424586245942455824495244422442924399
1938	243792441424449245002451624534245422455224524244772440424366
1939	243472434624393244842454224539245472454324505244642441424370
1940	243482431324302243952451824572245702452624470244352440024398
1941	244312442324401244522450024516245192450124466244292441124390
1942	243792437224412245102454724579245622454624493244402440624382
1943	244172443424451245062459924686246642460824523244392441124362
1944	243382433624349244252451824556245602451324461244022435424343
1945	243432434424413245132456924605245932454124479244812443624407
1946	244202442524440244292443124485245072448824443244122439024357
1947	243752441124399244942458124685246852464524560244572439324358
1948	243582435224400245062455024564245432450224445243892436924354
1949	243722440824437244782450124510245152448224446244142436624346
1950	244022445124462245682458724574245572452824485244342440324408
1951	244322446124512246102465724635246152455024487244212438424381
1952	244322450924542246212465324663246202456024494244272436824369
1953	243962440924426244882454224576245512451724466244022435524358
1954	243552437924455245232459824587245502449924484244442442624400
1955	244462444824490245752458924564245322450324450244322442124363
1956	243432433824371244442454624573245422449924467244032435324344

1957	243472436624394244382449324550245882454124482244112437224360
1958	243782437824402244762454824583245882457724560245142445824414
1959	243882440124435245372457724569245542451624470244372441424430
1960	[illegible]
1961	242752424424312244012451224561245622452324476244092434824319
1962	242942425324300243942447824505244472449024449244312440124389
1963	243442430124291243992449224529245152449424442243762432724300
1964	242552422824230243132439724437244392440924363242902422524187
1965	241812419624248243182440924450244682445024432244092439624415
1966	[illegible]
1967	244232443124423245002456724610244302460524548245072449024456
1968	244292442124418244832449824549245772455024509244432440624416
1969	244202443924422244882455924601245862454024463244002437924375
1970	243682437424383244562452024542245622453624482244482442024417
1971	244182441424454245152457124560245432450924487244412439124381
1972	[illegible]
1973	245482460224635247262473724721246592457324490244322439524398
1974	244612451924548246032465824682246522457624486244122437124378
1975	243932443524488245442457224575245432450324476244602442224405
1976	244252445524566246572470124701246662460424525244692441024370

```
XX        XX    LL              FFFFEEFFEEEE    RRRRRRRRRR          IIIIII      EEEEEEEEEEEE
 XX      XX     LL              FEEFEEFFEEEE    RRRRRRRRRRR         IIIIII      EEEFEEEEEEFEE
  XX    XX      LL              FF              RR        RR          II        EE
   XX  XX       LL              FF              RR        RR          II        EE
    XXXX        LL              FF              RR        RR          II        EE
     XX         LL              EEFFEEEF        RRRRRRRRRRR           II        EEEEEEEE
     XX         LL              EEFFEEEF        RRRRRRRRRRR           II        EEEEEEEE
    XXXX        LL              EE              RR    RR              II        EE
   XX  XX       LL              EE              RR     RR             II        EE
  XX    XX      LL              EE              RR      RR            II        EE
 XX      XX     LLLLLLLLLLLL    EEEEEEEEEEEE    RR       RR         IIIIII      EEEEEEEEEEEE
XX        XX    LLLLLLLLLLLL    EEEEEEEEEEEE    RR        RR        IIIIII      EEEEEEEEEEEE
```

* * * * * * UNIVAC 1100 TIME/SHARING EXEC --- MULTI-PROCESSOR SYSTEM --- LEV. 1182*V52 SITE * U11-80 * * * * * *

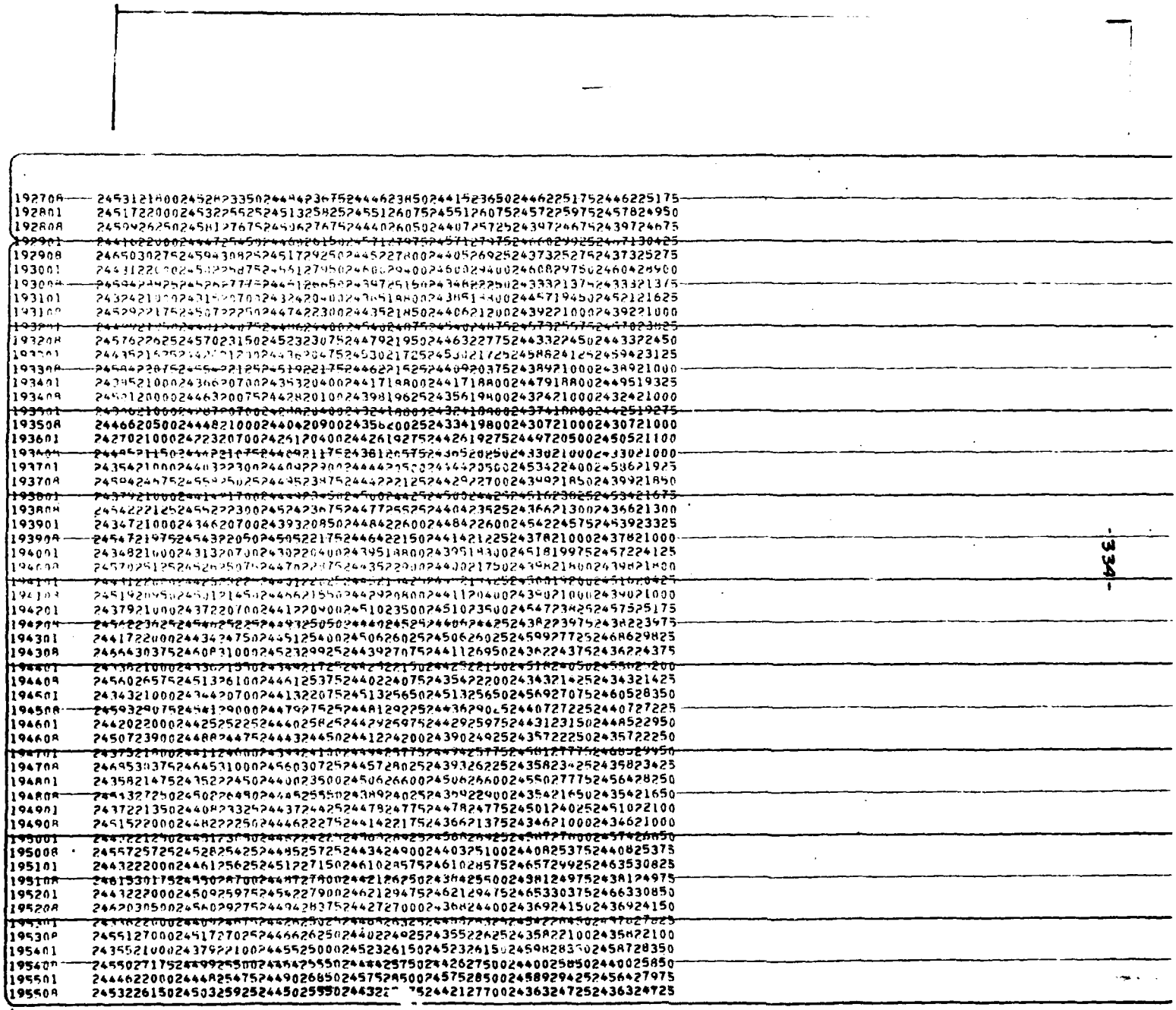
RUNID * XLERIE PART NUMBER * 00 OUTPUT DEVICE * RMSP15

FILE NAME * BASE-4 NON-STANDARD PRINT FILE PRINTED AT: 14:42:40 JUN 11,1981

1 6789 3456 123 8901 3678 3456 0123 7890 567 2345 9012 4789 4567 1234 4789 01 4567 8 SEQ NO. 02

BASE CASE CAT:

```
190001  24442210502443021325244522262524521229252452122925245572410024576213251
190008  24415210475240622702524494249172624042617524922940244502451502445025150
190101  24422220002439722000243892040024515239002451523900245642530024574256501
190108  24555254502452223975244842490024421237502437222075243762195024376219501
190201  24391218002437421125244312245024487241252444724125245042200245442165O
190208  24629256502461029175245352872524453273252439925500243622277524362227751
190301  24358210752438122825244542502524549271252454927125245422747524528252751
190308  24412540002441124925244542502524549271252454927125245422747524528252751
190401  24309210002433021125243962272524537264752453726475246062810024636288751
190408  24627293752458030350245102950024444278502437125100243262125024326212501
190501  24338210002430420025241420002442420875244280875245052230024564264875
190508  24591275002457128775245002885024435272252437625175243642317524364231751
190601  24400220002441102492524397244502444292357524429235752446622767524516226001
190608  24453267275245324411752446425002442582502442440042577524377252502437125250
190701  24426220002444025425244172532524458253502445825350244982437524538243751
190708  24556254002455126975244452595502444626950244132710024384253252438425325
190801  24430220002440002557524457204002455027900245402790024502292002461629700
190808  24503297502454739625244572712524394253502434722675243142122524314212251
190901  24304210002433020875243722150244412250024441225002455926250245802740O
190908  24454276002442227475244337402442591243002443522175243472155024347215501
191001  24343210002435620725244122350244622310024462231002452842350245502462S
191008  24543243252456251002444725625244352522524377237002435021550243502155O
191101  24339210002434020900243940800244271920024427192002450520075245512125O
191108  24568219502454323300245152300244902235024451233252443023600244302360O
191201  24430220002441022800244012232524498234002449823800245882615024643273251
191208  24411224002442227475244337402442591243002443522175243472155024347215501
191301  24442220002448975650244742650024581233752458123775245605290502460629350
191308  24575241752452023752446426625244142537524381525100243632347524363234751
191401  24356210225243732302424357211002447124125244712412525463825650245532597S
191408  24538258002450825125244922605024423253002436234002433021625243302162S
191501  24325210002436121600243932277524411202252441120225244611947524495212O0
191508  24411224002442227475244337402442591243002443522175243472155024347215501
191601  24390210752441224350244042502449125550244912555024566272252466028800
191608  24553302502456430450244662760024396240252436122400243472150024346721500
191701  24392210002435921475243972200245122575024551225750245352637524577270250
191708  24616284975245773052524591248002443728225244112825024376256752437625675
191801  24345214502435322575244162515024478264502447826850244862552524500241O0
191808  24412540002441124925244542502524549271252454927125245422747524528252751
191901  24399220002440124775244072595024463258502446325850245542740024615293S0
191908  24595299002452229175244592722524460256752437324875243492182524349218251
192001  24339210002432020875243352040002441920025244192002524488260502452221700
192008  24562220002456025100245222677524466263252441125600244062500024406250O0
192101  24626220002441624775244382545024490261252449026125245192577524527246251
192108  24412540002441124925244542502524549271252454927125245422747524528252751
192201  24347212252436921525244082280024502245752450224575245592645024572265O0
192208  24586280752453227325244472655024406248252435422350243132120024313212O0
192301  24310210002430620700243372040024426194502442619450245042196752458222325
192308  24599236502455923575245162407524465225252443321502443023450244302345O
192401  24431220002443323425244192265024476224502447622450245562420024583253O0
192408  24412540002441124925244542502524549271252454927125245422747524528252751
192501  24284210002428820700243722145024430227252443022725244512162524462212751
192508  24455217252444222000244112212524374215752436921650243692262524369226251
192601  24329210002430220700242912040024378184800243781848002448019875245102092S
192608  24515215752450620000244982245024480253502446226250244392602524439260251
192701  24410220002430923775244012405024432239252443223925244492180024503215501
```



```
195801  2434321000243382177524371233252444624475244424475245467692524573292 00
195808  2454227825244992680024467268002440325450243532300024344213752434421375
195701  2434721000243662202524394228252443422500244382250024493217002455022000
195708  2455825200245412580024482252062441123325243722182424802139024338021350
195801  2437821175243782070024402204002447618850244761885024548195002458321250
195808  2454821825245772202524560225675245142427524458235502441421300244142130 0
195901  2438821000244012070024432172924537243252453724325245772567524566925350
195908  2455424050245162212524470220752443721975244142160024430227002443022700
196001  2446422000244712450244652445024544251752454425175246262710024643928725
196008  2455625100245362685024465230752440023650243942220024312213502431221350
196101  2427521000242442070024312204002440119775244011977524512232524564125800
196108  2456225550245232505024476251502440923675243482352524319215752431921575
196201  2423421000242832070024300204002439818800243981880024478195002450921075
196208  2449721425244902200024449220502443121750244012145024389213752438921375
196301  2434420850243012072524291197752439918752439918752449219150245292057 5
196308  2455521375244942190024462211752437621350243272047524300210002430021000
196401  2425521000242280675242301932524313177002431317700243971837524437195 50
196408  2443920125244092072524363208002429020550242251982521A719225241A719225
196501  2421411A67524196182002424811900243141817524318181752440917625244501895 0
196508  2446820200244502057524432202502440920425243962070024415217002441521700
196601  2441521925244032190024441232002446822950244682295024668208002452021125
196608  2442421850244962182524485220252481921350243072042524613211002461321100
196701  2442321000244312210024423206252450021075245002107524567216002461021425
196708  2463023375246052475025454824650245072557524449027075244562740024456274 00
196801  2442924350244212482524414233502444325375244432537524449232502454922850
196808  2457724750245502572524509265252444325655244062495024461625325244162532 5
196901  2442023175244392512524422249002444842595244842595245592700024601286 50
196908  2454629300245402902524663272152440025124263742420024377237524637923725
197001  2436822275243742290024383228502445623175244562317524502425024542241 75
197008  2454225325245362620024448225800244482597524420263502441725425244172542 5
197101  2441823485244142847524494260002491426825249142682524971283792456027225
197108  2454326250245095700244872655252444126250243912567524381242752438124275
197201  2440222100244232277524458251002463226950245322695024621284825246403007 5
197208  2455431075245303100024555307752447530100244522800244841284502448128950
197301  2454825025244022845024635298252472632425247263242524737336752472134975
197308  2465935000245733235024490310252443229400243952825024398264002439826400
197401  2446123875245192685024562962502460330850246033085024658308252488232750
197408  2465233600245763305024486310002441228A0024371274752437427775243782777 5
197501  2439324550244352495024488279252454430200245443020024572303502457530850
197508  2454328725245032820024478285252468029325244272884752440526375244052637 5
197601  2442524450244552590024566289002446573060024657306002470132825247013482 5
197608  2446634975246043260024525309252446930150244102870024370233002437023300
9999
```

SECTION 5.0

SAMPLE OUTPUT

The sample output listed here is for the Lake Erie Regulation Study Base Case. Only the first page or two of each listing for each river and summary are provided.

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS — BASE CASE CAT1
ST MARYS RIVER POWER PLANTS

DATE	L.SUPERIOR LEVEL (FT)	L.SUPERIOR OUTFLOW (CFS)	LAKE HURON LEVEL (FT)	@ CANADA SHARE (CFS)	@ CANADA USEABLE (CFS)	GREAT LAKES HEADWATER (FT)	GREAT LAKES TAILWATER (FT)	GREAT LAKES HEAD (FT)	GREAT LAKES OUTPUT (MW)
1970 JAN	601.36	82900	577.44	40350.	37031.	599.74	580.42	19.32	50.8
1970 FEB	601.16	82350	577.47	40125.	36819.	599.51	580.40	19.10	49.9
1970 MAR	600.98	81860	577.57	39880.	36594.	599.30	580.42	18.87	49.0
1970 APR	600.92	81700	577.71	39600.	37212.	599.40	579.86	19.54	51.6
1970 MAY	601.02	113890	577.96	55320.	36039.	599.39	581.09	18.30	46.8
1970 JUN	601.00	113720	578.15	55185.	35929.	599.37	581.19	18.18	46.4
1970 JUL	601.10	110420	578.41	53385.	36031.	599.52	581.23	18.29	46.8
1970 AUG	601.40	116090	578.66	56195.	36040.	599.85	581.57	18.29	46.8
1970 SEP	601.78	121500	578.71	59050.	36249.	600.27	581.78	18.49	47.5
1970 OCT	601.93	123080	578.69	59965.	36320.	600.44	581.83	18.61	48.0
1970 NOV	601.69	120580	578.65	58740.	36213.	600.17	581.72	18.45	47.4
1970 DEC	601.32	82770	578.43	40185.	37210.	599.91	580.38	19.52	51.6
1971 JAN	600.95	81790	578.15	39795.	36300.	599.28	580.72	18.57	47.8
1971 FEB	600.66	80990	578.04	39445.	36050.	598.93	580.62	18.31	46.9
1971 MAR	600.50	80585	578.21	39230.	35798.	598.75	580.69	18.06	45.9
1971 APR	600.53	80650	578.59	39075.	36278.	598.97	580.41	18.56	47.8
1971 MAY	600.64	98540	578.89	47845.	35634.	599.05	581.14	17.91	45.4
1971 JUN	600.86	86390	579.06	41520.	36179.	599.37	580.91	18.46	47.5
1971 JUL	601.17	102280	579.20	49315.	35942.	599.68	581.46	18.22	46.5
1971 AUG	601.26	116310	579.28	56305.	35533.	599.71	581.94	17.77	44.8
1971 SEP	601.11	95735	579.06	46165.	36209.	599.63	581.18	18.45	47.4
1971 OCT	601.03	81990	578.78	39415.	36691.	599.58	580.60	18.98	49.5
1971 NOV	600.89	108610	578.50	52755.	35806.	599.28	581.22	18.07	45.9
1971 DEC	600.59	70120	578.24	33860.	33860.	599.31	579.80	19.50	47.5
1972 JAN	600.30	69870	578.05	33835.	33835.	598.77	580.14	18.63	45.3
1972 FEB	600.08	69680	577.90	33790.	33790.	598.49	580.04	18.45	44.7
1972 MAR	599.96	69580	577.85	33740.	33740.	598.38	580.07	18.27	44.2
1972 APR	600.02	69630	578.12	33565.	33565.	598.60	579.69	18.91	45.6
1972 MAY	600.25	79920	578.35	38335.	36160.	598.41	580.22	18.40	47.2
1972 JUN	600.53	80650	578.65	38650.	36233.	598.98	580.45	18.52	47.7
1972 JUL	600.71	81140	578.97	38745.	36224.	599.21	580.70	18.51	47.6
1972 AUG	600.77	70280	579.02	33295.	33290.	599.57	580.37	19.20	46.0
1972 SEP	600.61	67255	578.77	31925.	31925.	599.73	580.09	19.64	45.6
1972 OCT	600.82	70320	578.69	33585.	33585.	599.61	579.99	19.62	47.5
1972 NOV	600.78	88370	578.28	41985.	36622.	599.24	580.37	18.87	49.0
1972 DEC	600.62	70150	578.07	33875.	33875.	599.34	579.67	19.67	48.0
1973 JAN	600.34	69940	577.89	33870.	33870.	598.97	580.08	18.83	45.8
1973 FEB	600.07	69670	577.93	33785.	33785.	598.48	580.04	18.42	44.6
1973 MAR	599.94	69540	578.15	33735.	33735.	598.42	580.14	18.12	43.8
1973 APR	600.17	69770	578.43	33860.	33860.	598.76	579.97	18.78	45.3
1973 MAY	600.54	80670	578.67	38715.	36233.	598.99	580.47	18.52	47.7
1973 JUN	600.85	100010	578.86	48335.	35889.	599.29	581.17	18.13	46.2
1973 JUL	600.97	97850	578.95	47265.	36284.	599.40	581.69	18.52	47.7
1973 AUG	601.09	97870	579.07	47355.	36285.	599.56	581.27	18.37	47.1
1973 SEP	601.13	91870	579.08	44310.	34577.	599.47	581.05	18.83	48.1

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS
ST MARYS RIVER POWER PLANTS

BASE CASE CAT1
1900-1976

DURATION LISTING FOR LAKE SUP LEVELS (FT) FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE
1900	601.36	601.36	.65
1975	601.02	1202.38	1.95
1901	600.95	1803.33	3.25
1952	600.95	2404.28	4.55
1969	600.91	3005.19	5.84
1919	600.87	3606.06	7.14
1974	600.81	4206.87	8.44
1972	600.80	4807.67	9.74
1917	600.77	5408.44	11.04
1929	600.76	6009.20	12.34
1971	600.76	6609.96	13.64
1973	600.76	7210.72	14.94
1976	600.71	7811.43	16.23
1916	600.69	8412.12	17.53
1906	600.68	9012.80	18.83
1930	600.63	9613.43	20.13
1914	600.58	10214.01	21.43
1907	600.57	10814.51	22.73
1951	600.49	11415.00	24.03
1916	600.48	12015.48	25.32
1954	600.48	12615.96	26.62
1953	600.47	13216.43	27.92
1905	600.46	13816.89	29.22
1910	600.46	14417.35	30.52
1946	600.41	15017.76	31.82
1903	600.38	15618.14	33.12
1920	600.37	16218.51	34.42
1921	600.37	16818.88	35.71
1955	600.36	17419.24	37.01
1970	600.33	18019.57	38.31
1902	600.30	18619.87	39.61
1938	600.29	19220.16	40.91
1931	600.29	19820.45	42.21
1945	600.29	20420.74	43.51
1904	600.28	21021.02	44.81
1956	600.27	21621.29	46.10
1944	600.25	22221.54	47.40
1947	600.25	22821.79	48.70
1943	600.24	23422.03	50.00
1913	600.22	24022.25	51.30
1948	600.22	24622.47	52.60
1939	600.21	25222.68	53.90
1909	600.18	25822.86	55.19
1915	600.16	26423.02	56.49
1928	600.16	27023.18	57.79
1942	600.12	27623.30	59.09
1961	600.06	28223.36	60.39

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS
ST MARYS RIVER POWER PLANTS

BASE CASE CAT1
1900-1976

DURATION LISTING FOR LAKE SUP LEVELS (FT) FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE		
1932	600.05	28823.41	61.69		
1966	600.03	29423.44	62.99		
1912	600.02	30023.46	64.29		
1949	600.01	30623.47	65.58		
1957	599.93	31223.40	66.88		
1962	599.92	31823.32	68.18		
1927	599.91	32423.23	69.48		
1940	599.91	33023.14	70.78		
1935	599.90	33623.04	72.08		
1958	599.90	34222.94	73.38		
1968	599.90	34822.83	74.68		
1960	599.84	35422.67	75.97		
1967	599.83	36022.50	77.27		
1950	599.82	36622.32	78.57		
1936	599.80	37222.12	79.87		
1938	599.79	37821.91	81.17		
1941	599.79	38421.70	82.47		
1923	599.72	39021.42	83.77		
1934	599.69	39621.11	85.06		
1937	599.66	40220.77	86.36		
1911	599.65	40820.42	87.66		
1922	599.64	41420.06	88.96		
1933	599.61	42019.67	90.26		
1959	599.61	42619.28	91.56		
1963	599.59	43218.87	92.86		
1924	599.54	43818.41	94.16		
1965	599.47	44417.88	95.45		
1964	599.39	45017.27	96.75		
1925	599.24	45616.51	98.05		
1926	599.00	46215.51	99.35	AVERAGE VALUE	600.20

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS
ST MARYS RIVER POWER PLANTS

BASE CASE CAT1
1900-1976

DURATION LISTING FOR LAKE SUP OUTFLOWS(CFS) FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE
1916	85750	85750	.65
1951	85040	170790	1.95
1935	82940	253730	3.25
1900	82900	336630	4.55
1931	81790	418420	5.84
1969	81680	500100	7.14
1919	81560	581660	8.44
1972	81370	663030	9.74
1971	81260	744290	11.04
1966	79350	823640	12.34
1975	76760	900400	13.64
1952	76640	977040	14.94
1917	76310	1053350	16.23
1929	76300	1129650	17.53
1906	76150	1205800	18.83
1914	75960	1281760	20.13
1910	75760	1357520	21.43
1945	75460	1432980	22.73
1956	75420	1508400	24.03
1947	75390	1583790	25.32
1939	75310	1659100	26.62
1965	74050	1733150	27.92
1973	70270	1803420	29.22
1937	70050	1873470	30.52
1905	70010	1943480	31.82
1946	69960	2013440	33.12
1903	69940	2083380	34.42
1902	69870	2153250	35.71
1904	69850	2223100	37.01
1943	69820	2292920	38.31
1915	69750	2362670	39.61
1962	69710	2432380	40.91
1932	69650	2502030	42.21
1950	69470	2571500	43.51
1936	69450	2640950	44.81
1938	69440	2710390	46.10
1959	69290	2779680	47.40
1974	67250	2846930	48.70
1976	67210	2914140	50.00
1930	67190	2981320	51.30
1918	67130	3048450	52.60
1954	67130	3115590	53.90
1921	67090	3182670	55.19
1973	67070	3249740	56.49
1908	67040	3316780	57.79
1951	67060	3383840	59.09
1909	67040	3450880	60.39

-340-

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS — BASE CASE CAT1
ST MARYS RIVER POWER PLANTS — 1900-1976

DURATION LISTING FOR LAKE SUP OUTFLOWS(CFS) FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE		
1948	67030	3517930	61.69		
1939	67020	3584950	62.99		
1928	67010	3651960	64.29		
1951	66980	3718940	65.58		
1912	66960	3785900	66.88		
1949	66960	3852860	68.18		
1957	66930	3919790	69.48		
1962	66930	3986720	70.78		
1927	66920	4053640	72.08		
1940	66920	4120560	73.38		
1958	66920	4187480	74.68		
1968	66920	4254400	75.97		
1960	66900	4321300	77.27		
1967	66900	4388200	78.57		
1934	66850	4455050	79.87		
1933	66820	4521870	81.17		
1964	66740	4588610	82.47		
1911	55000	4643610	83.77		
1913	55000	4698610	85.06		
1920	55000	4753610	86.36		
1922	55000	4808610	87.66		
1923	55000	4863610	88.96		
1924	55000	4918610	90.26		
1925	55000	4973610	91.56		
1926	55000	5028610	92.86		
1937	55000	5083610	94.16		
1941	55000	5138610	95.45		
1953	55000	5193610	96.75		
1955	55000	5248610	98.05		
1963	55000	5303610	99.35	AVERAGE VALUE	68078

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS
ST MARYS RIVER POWER PLANTS

BASE CASE CAT1
1900-1976

DURATION LISTING FOR LAKE HUR LEVELS (FT) FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE
1974	579.89	579.89	.65
1973	579.72	1159.61	1.95
1975	579.66	1739.27	3.25
1952	579.61	2318.88	4.55
1929	579.30	2898.18	5.84
1976	579.30	3477.48	7.14
1930	579.19	4056.67	8.44
1953	579.16	4635.83	9.74
1919	579.13	5214.96	11.04
1917	579.08	5794.04	12.34
1955	579.03	6373.07	13.64
1918	578.97	6952.04	14.94
1972	578.93	7530.97	16.23
1906	578.80	8109.77	17.53
1971	578.73	8688.50	18.83
1907	578.63	9267.11	20.13
1938	578.59	9845.70	21.43
1914	578.56	10424.26	22.73
1920	578.54	11002.80	24.03
1944	578.45	11581.25	25.32
1905	578.42	12159.67	26.62
1954	578.41	12738.08	27.92
1921	578.40	13316.48	29.22
1946	578.40	13894.88	30.52
1970	578.36	14473.24	31.82
1913	578.33	15051.57	33.12
1904	578.21	15629.78	34.42
1969	578.16	16207.94	35.71
1901	578.15	16786.09	37.01
1910	578.11	17364.20	38.31
1902	578.05	17942.25	39.61
1948	577.98	18520.21	40.91
1922	577.94	19098.15	42.21
1924	577.93	19676.08	43.51
1931	577.92	20254.00	44.81
1903	577.88	20831.88	46.10
1916	577.84	21409.76	47.40
1915	577.82	21987.63	48.70
1965	577.82	22565.50	50.00
1943	577.80	23143.30	51.30
1951	577.77	23721.07	52.60
1947	577.63	24298.74	53.90
1956	577.57	24877.31	55.19
1961	577.56	25454.87	56.49
1923	577.50	26031.71	57.79
1912	577.50	26609.21	59.09
1966	577.49	27186.70	60.39

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS
ST MARYS RIVER POWER PLANTS

BASE CASE CAT1
1900-1976

DURATION LISTING FOR LAKE HUR LEVELS (FT) FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE		
1928	577.55	27764.43	61.69		
1970	577.49	28341.87	62.99		
1942	577.41	28915.28	64.29		
1911	577.39	29496.67	65.58		
1957	577.37	30074.04	66.86		
1958	577.33	30651.35	68.13		
1960	577.31	31227.66	69.48		
1949	577.30	31805.96	70.78		
1952	577.26	32382.22	72.08		
1919	577.25	32960.46	73.38		
1940	577.22	33537.68	74.68		
1941	577.18	34114.86	75.97		
1924	577.16	34692.02	77.27		
1932	577.09	35269.11	78.57		
1967	576.90	35846.01	79.87		
1966	576.86	36422.87	81.17		
1925	576.76	36999.63	82.47		
1927	576.72	37576.35	83.77		
1950	576.69	38153.04	85.06		
1933	576.65	38729.69	86.36		
1938	576.52	39306.21	87.66		
1936	576.47	39882.68	88.96		
1934	576.44	40459.12	90.26		
1935	576.44	41035.56	91.56		
1937	576.36	41611.92	92.86		
1963	576.34	42188.26	94.16		
1959	576.09	42764.35	95.45		
1926	575.72	43340.07	96.75		
1964	575.68	43915.75	98.05		
1965	575.51	44491.26	99.35	AVERAGE VALUE	577.81

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS — BASE CASE CAT1
ST MARYS RIVER POWER PLANTS — 1900-1976

DURATION LISTING FOR ST MARYS R OUTPUT (MW) FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE
1959	50.0	50.0	.65
1951	47.9	98.7	1.95
1969	47.7	146.3	3.25
1939	47.7	193.6	4.55
1956	46.8	240.4	5.84
1910	46.7	287.1	7.14
1907	46.7	333.8	8.44
1945	46.5	380.3	9.74
1916	46.4	426.7	11.04
1965	46.4	473.1	12.34
1918	46.3	519.4	13.64
1966	46.3	565.7	14.94
1906	46.2	612.0	16.23
1917	46.2	657.9	17.53
1971	46.0	703.9	18.83
1951	45.9	749.8	20.13
1903	45.8	795.6	21.43
1932	45.7	841.3	22.73
1975	45.7	887.0	24.03
1972	45.7	932.6	25.32
1936	45.6	978.2	26.62
1942	45.6	1023.8	27.92
1952	45.5	1069.3	29.22
1919	45.5	1114.8	30.52
1938	45.5	1160.3	31.82
1935	45.5	1205.8	33.12
1929	45.4	1251.2	34.42
1943	45.4	1296.7	35.71
1950	45.4	1342.1	37.01
1959	45.3	1387.4	38.31
1902	45.3	1432.6	39.61
1905	45.2	1477.8	40.91
1946	45.1	1522.9	42.21
1907	45.0	1568.0	43.51
1915	45.0	1613.0	44.81
1908	44.9	1657.9	46.10
1927	44.8	1702.7	47.40
1923	44.8	1747.5	48.70
1934	44.4	1791.7	50.00
1931	44.4	1836.2	51.30
1904	44.4	1880.6	52.60
1967	44.3	1924.9	53.90
1954	44.3	1969.2	55.19
194	44.2	2013.4	56.49
1960	44.2	2057.6	57.79
1962	44.1	2101.7	59.09
1948	44.1	2145.8	60.39

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS
ST MARYS RIVER POWER PLANTS

BASE CASE CAT1
1900-1976

DURATION LISTING FOR ST MARYS R OUTPUT (MW) FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE		
1961	44.1	2189.9	61.69		
1939	44.1	2234.0	62.99		
1957	44.1	2278.0	64.29		
1912	44.0	2322.1	65.58		
1958	44.0	2366.1	66.88		
1973	44.0	2410.1	68.18		
1921	43.9	2454.1	69.48		
1933	43.9	2498.0	70.78		
1970	43.9	2541.8	72.08		
1960	43.8	2585.7	73.38		
1968	43.7	2629.3	74.68		
1976	43.5	2672.8	75.97		
1944	43.5	2716.3	77.27		
1930	43.4	2759.7	78.57		
1908	43.4	2803.1	79.87		
1918	43.3	2846.4	81.17		
1974	42.7	2889.2	82.47		
1937	39.0	2928.2	83.77		
1963	36.9	2965.0	85.06		
1901	38.4	3003.4	86.36		
1926	38.1	3041.5	87.65		
1920	37.9	3079.3	88.94		
1934	37.9	3117.1	90.24		
1913	37.9	3154.9	91.53		
1911	37.9	3192.7	92.82		
1923	37.6	3230.3	94.12		
1925	37.6	3267.9	95.41		
1953	37.1	3305.1	96.71		
1955	37.1	3342.2	98.00		
1922	37.0	3379.2	99.35	AVERAGE VALUE	83.9

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS
ST MARYS RIVER POWER PLANTS

BASE CASE CATI
1900-1976

DURATION LISTING FOR ST MARYS R OUTPUT(MWH) FOR WHOLE YEAR

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE
1900	425373.3	425373.3	.65
1965	421790.9	847164.3	1.95
1934	416107.9	1263272.1	3.25
1966	415677.9	1678946.0	4.55
1935	415201.7	2094147.3	5.84
1949	413149.7	2507297.0	7.14
1915	412949.2	2920246.2	8.44
1938	412835.1	3333081.2	9.74
1964	412810.5	3745891.7	11.04
1942	412580.6	4158472.3	12.34
1914	412440.7	4570912.9	13.64
1946	411978.3	4982891.2	14.94
1906	411380.6	5394271.7	16.23
1939	411315.1	5805586.8	17.53
1901	410922.0	6216508.8	18.83
1947	409707.5	6626216.2	20.13
1950	409410.6	7035626.9	21.43
1903	408501.8	7444128.7	22.73
1958	408419.5	7852548.2	24.03
1932	408384.3	8260932.4	25.32
1945	408297.3	8669229.6	26.62
1959	407772.5	9077002.0	27.92
1968	407752.3	9484754.2	29.22
1902	407600.6	9892354.7	30.52
1969	406529.0	10298883.7	31.82
1933	405629.1	10704512.7	33.12
1970	405027.7	11109540.4	34.42
1909	404841.5	11514381.7	35.71
1927	404545.0	11918926.7	37.01
1936	403990.7	12322917.4	38.31
1944	403568.4	12726485.7	39.61
1905	403103.1	13129588.9	40.91
1928	402635.7	13532224.5	42.21
1967	402564.5	13934788.9	43.51
1971	402547.7	14337336.5	44.81
1916	402039.7	14739376.1	46.10
1907	400275.0	15139651.0	47.40
1951	399027.6	15538674.5	48.70
1972	398534.6	15937209.0	50.00
1904	398452.4	16335661.2	51.30
1937	397149.3	16732810.5	52.60
1957	395722.5	17128533.0	53.90
1941	394641.6	17523174.5	55.19
1963	392575.2	17915749.5	56.49
1962	392546.1	18308296.5	57.79
1956	392340.3	[illegible]	59.09
1943	392275.7	[illegible]	65.39

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS
ST MARYS RIVER POWER PLANTS

BASE CASE CAT1
1900-1976

DURATION LISTING FOR ST MARYS R OUTPUT(MWH) FOR WHOLE YEAR

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE
1948	391188.6	19484099.7	61.69
1955	391134.7	19875234.2	62.99
1930	389812.9	20253047.0	64.29
1946	389297.1	20654344.0	65.58
1940	388948.9	21043292.7	66.88
1931	388074.2	21431918.7	68.18
1961	387611.6	21819530.2	69.48
1917	386793.9	22206324.0	70.78
1918	385254.7	22591576.2	72.08
1912	384882.7	22976460.5	73.38
1913	384730.6	23361191.0	74.68
1954	384707.1	23745898.0	75.97
1921	382209.1	24128107.0	77.27
1960	380499.1	24508606.0	78.57
1952	379003.9	24887609.7	79.87
1974	376915.4	25264525.0	81.17
1973	375907.9	25640432.7	82.47
1910	373058.7	26013491.2	83.77
1953	372954.0	26386445.2	85.06
1975	372748.2	26759193.2	86.36
1911	371576.9	27130770.0	87.66
1929	369471.6	27500241.5	88.96
1920	369033.9	27869275.2	90.26
1919	363612.8	28232888.0	91.56
1926	358980.1	28591868.0	92.86
1976	355231.1	28947099.0	94.16
1925	342031.8	29289130.7	95.45
1923	332617.9	29621748.5	96.75
1922	329496.0	29951244.5	98.05
1924	329484.9	30280729.2	99.35

AVERAGE VALUE 393256.2

PASE CASE CAT1 NIAGARA AREA OCT 17/90 PAGE : 1

REPORT TYPE : 02
PLOT TYPE : 01

FLOW OVER NIAGARA FALLS
DAYTIME FLOW BY MONTH (CFS)
 50600. 50600. 50600.100600.100600.100600.100600.100600.100600.100600. 50600. 50600.

NIGHTIME FLOW BY MONTH (CFS)
 50600. 50600. 50600. 50600. 50600. 50600. 50600. 50600. 50600. 50600. 50600. 50600.

MONTHLY ADJUSTMENTS (CFS)

 -3100. -2800. -3500. 300. 4100. 4500. 4400. 4500. 4200. 4100. 3400. -1200.

MONTHLY MATERIAL DOCK ELEVATION (FT)

 561.00 561.00 561.00 561.00 561.00 561.00 561.00 561.00 561.00 561.00 561.00 561.00

YEAR/ MONTH	FLOW IN CFS: LAKE ERIE	L.ERIE ADJUST	TO GIP	TO CANADA	TO USA	TO DECEW	BECK & CASCADES	TO BECK	TO OP	TO CNP	CANADA ENERGY OUTPUT (AVE.MW.) TREATY HOURS-NO PGS: DECEW	BECK	OP	CNP	TOTAL
1980 JAN NTN	181730.	184830.	178030.	69615.	64615.	6800.	62815.	62815.	0.	0.	138.5	1395.1	.0	.0	1533.6
1980 JAN NTD	181730.	184830.	178030.	69615.	64615.	6800.	62815.	62815.	0.	0.	138.5	1395.1	.0	.0	1533.6
1980 FEB NTN	182610.	185410.	178610.	69905.	64905.	6800.	63105.	63105.	0.	0.	138.5	1403.9	.0	.0	1542.5
1980 FEB NTD	182610.	185410.	178610.	69905.	64905.	6800.	63105.	63105.	0.	0.	138.5	1403.9	.0	.0	1542.5
1980 MAR NTN	191690.	195190.	188690.	74795.	69795.	6500.	68295.	64924.	3371.	0.	132.4	1433.1	42.5	.0	1608.0
1980 MAR NTD	191690.	195190.	188690.	74795.	69795.	6500.	68295.	64924.	3371.	0.	132.4	1433.1	42.5	.0	1608.0
1980 APR TN	198230.	197930.	193030.	69824.	71165.	4900.	64924.	64924.	0.	0.	99.8	1431.8	.0	.0	1531.6
1980 APR TD	198230.	197930.	193030.	56039.	66165.	4900.	51139.	51139.	0.	0.	99.8	1162.9	.0	.0	1262.8
1980 MAY TN	207290.	203190.	199490.	71605.	73795.	3700.	67905.	64924.	2981.	0.	75.4	1429.2	37.6	.0	1542.2
1980 MAY TD	207290.	203190.	199490.	59321.	68795.	3700.	55621.	55621.	0.	0.	75.4	1253.8	.0	.0	1329.2
1980 JUN TN	206250.	201750.	197950.	70885.	73075.	3800.	67085.	63948.	3137.	0.	77.4	1407.3	39.5	.0	1524.2
1980 JUN TD	206250.	201750.	197950.	58601.	68075.	3800.	54801.	54801.	0.	0.	77.4	1234.9	.0	.0	1312.4
1980 JUL TN	202110.	197710.	193810.	68865.	71055.	3900.	64965.	63948.	1017.	0.	79.5	1407.1	12.8	.0	1499.4
1980 JUL TD	202110.	197710.	193810.	56581.	66055.	3900.	52681.	52681.	0.	0.	79.5	1191.6	.0	.0	1271.0
1980 AUG TN	203390.	198890.	194990.	69455.	71645.	3900.	65555.	63948.	1607.	0.	79.5	1406.6	20.2	.0	1506.3
1980 AUG TD	203390.	198890.	194990.	57171.	66845.	3900.	53271.	53271.	0.	0.	79.5	1204.0	.0	.0	1283.4
1980 SEP TN	199550.	195350.	191350.	67685.	69875.	4000.	63685.	62576.	1109.	0.	81.5	1378.3	14.0	.0	1473.8
1980 SEP TD	199550.	195350.	191350.	55401.	64875.	4000.	51401.	51401.	0.	0.	81.5	1164.6	.0	.0	1246.0
1980 OCT TN	196190.	192090.	188190.	66476.	68245.	3900.	62576.	62576.	0.	0.	79.5	1381.4	.0	.0	1460.9
1980 OCT TD	196190.	192090.	188190.	53448.	63245.	3900.	49548.	49548.	0.	0.	79.5	1128.4	.0	.0	1207.8
1980 NOV NTN	194120.	190720.	186720.	72560.	67560.	4000.	68560.	62576.	5984.	0.	81.5	1381.8	75.4	.0	1538.7
1980 NOV NTD	194120.	190720.	186720.	72560.	67560.	4000.	68560.	62576.	5984.	0.	81.5	1381.8	75.4	.0	1538.7
1980 DEC NTN	195490.	196690.	190590.	75545.	70545.	6100.	69445.	62576.	6869.	0.	124.3	1380.8	86.6	.0	1591.7
1980 DEC NTD	195490.	196690.	190590.	75545.	70545.	6100.	69445.	62576.	6869.	0.	124.3	1380.8	86.6	.0	1591.7

DURATION LISTING OF MONTHLY OVERALL DISCHARGE (CFS) FOR JANUARY

YEAR	DISCHARGE (CFS)	ACCUMULATED VALUE	PERCENT OF TIME EQUALLED OR EXCEEDED
1973	242860.00	242860.00	.65
1974	238250.00	481110.00	1.95
1975	238220.00	719330.00	3.25
1976	237790.00	957120.00	4.55
1977	231890.00	1188810.00	5.84
1978	226720.00	1415530.00	7.14
1979	225470.00	1640200.00	8.44
1980	221230.00	1861430.00	9.74
1981	217520.00	2078950.00	11.04
1982	215910.00	2294860.00	12.34
1983	215770.00	2510630.00	13.64
1984	211880.00	2722110.00	14.94
1985	210390.00	2932500.00	16.23
1986	209640.00	3142140.00	17.53
1987	209200.00	3351340.00	18.83
1988	209150.00	3560490.00	20.13
1989	209150.00	3769640.00	21.43
1990	207110.00	3976750.00	22.73
1991	206480.00	4183230.00	24.03
1992	206310.00	4389540.00	25.32
1993	205930.00	4595470.00	26.62
1994	205670.00	4801220.00	27.92
1995	204640.00	5005860.00	29.22
1996	204270.00	5210130.00	30.52
1997	204100.00	5414230.00	31.82
1998	203520.00	5617750.00	33.12
1999	203350.00	5821100.00	34.42
2000	200650.00	6021750.00	35.71
2001	200010.00	6221760.00	37.01
2002	199260.00	6421020.00	38.31
2003	198400.00	6619420.00	39.61
2004	197580.00	6817000.00	40.91
2005	197260.00	7014260.00	42.21
2006	196680.00	7210940.00	43.51
2007	196670.00	7407610.00	44.81
2008	196220.00	7603830.00	46.10
2009	196710.00	7800540.00	47.40
2010	195650.00	7996190.00	48.70
2011	195300.00	8191490.00	50.00
2012	194770.00	8386260.00	51.30
2013	194260.00	8580520.00	52.60
2014	194170.00	8774690.00	53.90
2015	193940.00	8968630.00	55.19

DURATION LISTING OF MONTHLY OVERALL DISCHARGE (CFS) FOR JANUARY

YEAR	DISCHARGE (CFS)	ACCUMULATED VALUE	PERCENT OF TIME EQUALLED OR EXCEEDED
1957	193290.00	9160810.00	56.49
1958	193280.00	9354090.00	57.79
1959	192900.00	9546990.00	59.09
1964	192500.00	9739490.00	60.39
1947	192070.00	9931560.00	61.69
1912	191390.00	10122950.00	62.99
1910	190730.00	10313680.00	64.29
1923	190680.00	10504360.00	65.58
1915	189940.00	10694300.00	66.88
1945	189610.00	10883910.00	68.18
1961	189530.00	11073440.00	69.48
1967	188650.00	11262090.00	70.78
1962	187160.00	11449250.00	72.08
1913	185410.00	11635060.00	73.38
1953	184570.00	11820630.00	74.68
1964	184020.00	12004650.00	75.97
1927	183580.00	12188230.00	77.27
1939	182180.00	12371610.00	78.57
1900	181730.00	12553340.00	79.87
1962	181630.00	12734970.00	81.17
1945	179110.00	12913680.00	82.47
1966	178700.00	13092180.00	83.77
1937	177040.00	13269220.00	85.06
1939	175480.00	13444570.00	86.36
1947	174960.00	13620260.00	87.66
1968	173130.00	13793390.00	88.96
1942	173110.00	13966500.00	90.26
1959	172170.00	14138670.00	91.56
1934	169970.00	14308640.00	92.86
1926	168070.00	14476710.00	94.16
1935	162170.00	14638880.00	95.45
1965	160140.00	14799020.00	96.75
1936	159870.00	14958890.00	98.05
1964	159160.00	15118050.00	99.35

NIAGARA AREA (ONTARIO)

YEAR/MONTH	O.P. PEAK (MW)	CNP. PEAK (MW)	DECEN PEAK (MW)	BECN PEAK (MW)	TOTAL (MW)	ADJUSTED TOTAL (TOTAL-75MW)
1980 JAN	95.62	.00	154.60	1880.00	2130.22	2055.22
1980 FEB	98.69	.00	154.60	1880.00	2133.29	2056.29
1980 MAR	105.00	7.60	154.38	1880.00	2146.98	2071.98
1980 APR	.00	.00	155.69	1812.40	1968.08	1893.08
1980 MAY	12.29	.00	155.99	1875.00	2043.29	1968.29
1980 JUN	2.89	.00	155.99	1866.87	2025.74	1950.74
1980 JUL	.00	.00	155.98	1837.65	1993.63	1918.63
1980 AUG	.00	.00	155.98	1846.42	2002.40	1927.40
1980 SEP	.00	.00	155.97	1816.93	1972.91	1897.91
1980 OCT	.00	.00	155.98	1778.87	1934.85	1859.85
1980 NOV	125.00	18.99	155.97	1880.00	2159.96	2084.96
1980 DEC	125.00	22.36	154.80	1880.00	2162.16	2087.16
1981 JAN	125.40	7.60	154.60	1880.00	2147.20	2072.20
1981 FEB	95.19	.00	154.60	1880.00	2129.79	2054.79
1981 MAR	99.28	.00	154.38	1880.00	2133.66	2058.66
1981 APR	.00	.00	155.69	1604.43	1760.12	1685.12
1981 MAY	.00	.00	155.99	1679.82	1835.82	1760.82
1981 JUN	.00	.00	155.99	1815.28	1971.27	1896.27
1981 JUL	.00	.00	155.98	1813.91	1969.89	1894.89
1981 AUG	.00	.00	155.98	1799.28	1955.26	1880.26
1981 SEP	.00	.00	155.97	1813.66	1969.63	1894.63
1981 OCT	.00	.00	155.98	1732.10	1888.08	1813.08
1981 NOV	125.00	18.53	155.97	1880.00	2155.49	2080.49
1981 DEC	125.00	15.68	154.80	1880.00	2155.45	2080.45
1982 JAN	125.00	7.60	154.60	1880.00	2147.20	2072.20
1982 FEB	75.62	.00	154.60	1880.00	2110.22	2035.22
1982 MAR	125.00	4.69	154.38	1880.00	2144.07	2069.07
1982 APR	.00	.00	155.69	1741.68	1897.37	1822.37
1982 MAY	3.11	.00	155.99	1867.11	2026.22	1951.22
1982 JUN	21.13	.00	155.99	1875.00	2052.12	1977.12
1982 JUL	73.63	.00	155.98	1875.00	2104.61	2029.61
1982 AUG	93.90	.00	155.98	1875.00	2114.88	2039.88
1982 SEP	43.29	.00	155.97	1875.00	2074.25	1999.25
1982 OCT	49.26	.00	155.99	1875.00	2080.34	2005.34
1982 NOV	125.00	44.93	155.97	1880.00	2185.90	2110.90
1982 DEC	125.00	38.36	154.80	1880.00	2177.87	2102.87
1983 JAN	125.00	7.60	154.60	1880.00	2147.20	2072.20
1983 FEB	125.00	7.60	154.60	1880.00	2147.20	2072.20
1983 MAR	125.00	7.60	154.38	1880.00	2146.98	2071.98
1983 APR	125.00	8.19	155.69	1875.00	2143.87	2068.87

DURATION LISTING OF OVERALL PEAK FOR JANUARY

YEAR	PEAK	ACCUMULATED VALUE	PERCENT OF TIME EQUALLED OR EXCEEDED
1976	2147.20	2147.20	.65
1975	2147.20	4294.40	1.95
1974	2147.20	6441.60	3.25
1973	2147.20	8588.80	4.55
1972	2147.20	10736.00	5.84
1971	2147.20	12883.20	7.14
1970	2147.20	15030.40	8.44
1969	2147.20	17177.60	9.74
1968	2147.20	19324.80	11.04
1967	2147.20	21472.00	12.34
1966	2147.20	23619.20	13.64
1965	2147.20	25766.40	14.94
1964	2147.20	27913.60	16.23
1963	2147.20	30060.80	17.53
1962	2147.20	32208.00	18.83
1961	2147.20	34355.20	20.13
1960	2147.20	36502.40	21.43
1959	2147.20	38649.60	22.73
1958	2147.20	40796.80	24.03
1957	2147.20	42944.00	25.32
1956	2147.20	45091.20	26.62
1955	2147.20	47238.40	27.92
1954	2147.20	49385.60	29.22
1953	2147.20	51532.80	30.52
1952	2147.20	53680.00	31.82
1951	2147.20	55827.20	33.12
1950	2147.20	57974.40	34.42
1949	2147.20	60121.60	35.71
1948	2147.20	62268.80	37.01
1947	2147.20	64416.00	38.31
1946	2147.20	66563.19	39.61
1945	2147.20	68710.39	40.91
1944	2147.20	70857.59	42.21
1943	2147.20	73004.79	43.51
1942	2147.20	75151.99	44.81
1941	2147.20	77299.19	46.10
1940	2147.20	79446.39	47.40
1939	2147.20	81593.59	48.70
1938	2147.20	83740.79	50.00
1937	2147.20	85887.99	51.30
1936	2147.20	88035.19	52.60
1935	2147.20	90182.39	53.90
1934	2147.20	92329.59	55.19

DURATION LISTING OF OVERALL PEAK FOR JANUARY

YEAR	PEAK	ACCUMULATED VALUE	PERCENT OF TIME EQUALLED OR EXCEEDED
1914	2147.20	94476.78	56.49
1913	2147.20	96623.98	57.79
1912	2147.20	98771.18	59.09
1910	2147.20	100918.38	60.39
1909	2147.20	103065.58	61.69
1908	2147.20	105212.78	62.99
1907	2147.20	107359.98	64.29
1906	2147.20	109507.18	65.58
1905	2147.20	111654.38	66.88
1904	2147.20	113801.59	68.18
1903	2147.20	115948.78	69.48
1902	2147.20	118095.98	70.78
1901	2147.20	120243.17	72.08
1911	2144.16	122387.29	73.38
1933	2144.09	124531.34	74.68
1923	2142.62	126673.96	75.97
1907	2141.72	128814.98	77.27
1939	2132.60	130947.58	78.57
1947	2130.22	133077.79	79.87
1962	2129.69	135207.48	81.17
1925	2115.79	137323.27	82.44
1966	2111.50	139434.77	83.77
1937	2107.47	141542.23	85.06
1938	2098.13	143640.36	86.36
1940	2094.31	145734.68	87.66
1913	2084.61	147819.29	88.96
1942	2084.50	149903.79	90.26
1959	2079.52	151983.31	91.56
1934	2067.32	154050.63	92.86
1928	2030.39	156081.01	94.16
1935	2015.80	158096.81	95.45
1965	2000.26	160096.87	96.75
1936	1996.08	162092.95	98.05
1964	1992.60	164085.55	99.35

DURATION LISTING OF DAYTIME ENERGY FOR JANUARY (MW.-OP. HOURS)

YEAR	ENERGY (MW.)	ACCUMULATED VALUE	PERCENT OF TIME EQUALLED OR EXCEEDED
1948	1934.63	1934.63	.65
1947	1934.06	3868.68	1.95
1918	1933.81	5802.49	3.25
1914	1933.63	7736.12	4.55
1916	1932.42	9669.54	5.84
1943	1932.76	11602.30	7.14
1909	1932.24	13534.54	8.44
1946	1932.00	15466.54	9.74
1921	1931.41	17397.94	11.04
1919	1931.13	19329.07	12.34
1929	1930.76	21259.83	13.64
1971	1930.67	23190.50	14.94
1951	1930.24	25120.74	16.23
1944	1929.20	27050.93	17.53
1928	1929.12	28980.05	18.83
1972	1929.05	30909.14	20.13
1917	1928.97	32838.11	21.43
1933	1928.89	34767.00	22.73
1908	1928.83	36695.83	24.03
1907	1928.48	38624.31	25.32
1988	1928.24	40552.55	26.62
1902	1928.00	42472.55	27.92
1965	1928.96	44357.41	29.22
1977	1928.79	46321.60	30.52
1976	1928.24	48286.04	31.82
1975	1927.85	50169.49	33.12
1930	1922.43	52091.91	34.42
1974	1921.41	54013.32	35.71
1954	1920.38	55933.71	37.01
1973	1917.65	57851.36	38.31
1963	1915.20	59766.56	39.61
1949	1909.91	61676.47	40.91
1922	1907.00	63583.47	42.21
1921	1906.09	65489.56	43.51
1944	1905.70	67395.27	44.81
1959	1902.27	69297.54	46.10
1950	1901.02	71198.96	47.40
1945	1901.13	73100.09	48.70
1962	1893.70	74993.79	50.00
1927	1890.45	76884.24	51.30
1941	1888.41	78772.65	52.60
1932	1888.06	80660.71	53.90
1936	1887.04	82547.75	55.19

DURATION LISTING OF DAYTIME ENERGY FOR JANUARY (MW.-OP. HOURS)

YEAR	ENERGY (MW.)	ACCUMULATED VALUE	PERCENT OF TIME EQUALLED OR EXCEEDED
1957	1885.44	84473.19	56.49
1959	1884.54	86357.73	57.79
1960	1882.57	88240.30	59.09
1958	1882.03	90122.33	60.39
1947	1877.33	91999.67	61.69
1962	1871.47	93871.14	62.99
1923	1871.30	95742.44	64.29
1910	1870.52	97612.96	65.58
1915	1866.47	99479.43	66.88
1945	1863.94	101343.37	68.18
1961	1860.81	103164.17	69.48
1957	1855.51	105019.68	70.78
1942	1848.86	106868.54	72.08
1941	1842.47	108711.01	73.38
1963	1837.96	110546.97	74.68
1939	1836.86	112383.83	75.97
1947	1829.11	114212.94	77.27
1939	1827.13	116040.07	78.57
1962	1818.84	117858.88	79.87
1911	1811.09	119669.97	81.17
1965	1793.99	121469.96	82.47
1968	1783.40	123253.36	83.77
1937	1779.89	125013.25	85.06
1939	1765.71	126778.96	86.36
1940	1759.83	128538.79	87.66
1967	1765.22	130294.01	88.96
1944	1744.86	132029.11	90.26
1959	1736.17	133765.28	91.56
1939	1717.35	135482.66	92.86
1926	1668.21	137150.87	94.16
1935	1649.98	138800.55	95.45
1965	1635.43	140436.00	96.75
1936	1627.62	142063.62	98.05
1969	1623.36	143686.98	99.35

DURATION LISTING OF NIGHTTIME ENERGY FOR JANUARY (MW.-OP. HOURS)

YEAR	ENERGY (MW)	ACCUMULATED VALUE	PERCENT OF TIME EQUALLED OR EXCEEDED
1948	980.58	980.58	.65
1947	980.41	1960.99	1.95
1918	980.24	2941.24	3.25
1914	980.11	3921.35	4.55
1916	979.47	4900.82	5.84
1943	978.69	5879.51	7.14
1906	978.63	6858.14	8.44
1969	978.46	7836.59	9.74
1919	978.24	8814.78	11.04
1921	977.90	9792.68	12.34
1929	977.78	10770.46	13.64
1971	977.70	11748.16	14.94
1946	977.45	12725.61	16.23
1953	977.41	13703.02	17.53
1951	977.26	14680.28	18.83
1972	977.24	15657.52	20.13
1913	976.50	16634.02	21.43
1948	976.27	17610.29	22.73
1907	975.62	18585.91	24.03
1928	975.20	19561.11	25.32
1952	974.69	20535.80	26.62
1975	974.46	21510.26	27.92
1965	974.42	22484.67	29.22
1976	974.37	23459.04	30.52
1937	977.78	24432.82	31.82
1974	972.42	25405.24	33.12
1960	971.76	26377.00	34.42
1973	969.62	27345.85	35.71
1977	969.27	28315.11	37.01
1954	965.45	29280.56	38.31
1963	960.10	30240.66	39.61
1949	954.63	31195.28	40.91
1922	951.61	32146.89	42.21
1931	950.66	33097.52	43.51
1944	950.23	34047.75	44.81
1959	946.73	34994.48	46.10
1950	945.87	35940.35	47.40
1935	945.49	36885.83	48.70
1962	937.93	37823.77	50.00
1920	934.42	38758.19	51.30
1941	932.42	39690.61	52.60
1932	932.06	40622.67	53.90
1956	930.89	41553.56	55.19

-357-

DURATION LISTING OF NIGHTTIME ENERGY FOR JANUARY (MW.-OP. HOURS)

YEAR	ENERGY (MW)	ACCUMULATED VALUE	PERCENT OF TIME EQUALLED OR EXCEEDED
1957	929.24	42482.80	56.49
1969	928.25	43411.06	57.79
1924	926.37	44337.43	59.09
1964	925.65	45263.08	60.39
1947	920.87	46183.95	61.69
1912	914.85	47098.80	62.99
1923	914.53	48013.32	64.29
1913	913.75	48927.07	65.58
1915	909.52	49836.60	66.88
1945	906.92	50743.52	68.18
1961	903.77	51647.29	69.48
1967	898.36	52545.65	70.78
1972	891.59	53437.23	72.08
1911	882.78	54320.01	73.36
1961	879.68	55199.69	74.68
1933	879.15	56079.14	75.97
1947	870.75	56949.89	77.27
1939	867.73	57817.62	78.57
1962	865.10	58682.72	79.87
1901	851.41	59534.13	81.17
1929	832.07	60366.21	82.47
1956	820.68	61186.89	83.77
1937	816.76	61983.25	85.06
1938	799.39	62782.64	86.36
1940	793.27	63575.91	87.66
1963	776.73	64352.64	88.96
1942	775.28	65127.92	90.26
1959	765.44	65893.35	91.56
1934	743.92	66637.27	92.86
1926	689.08	67326.35	93.16
1935	669.61	67995.96	95.45
1965	654.00	68649.97	96.75
1936	645.94	69295.92	98.05
1968	641.47	69937.37	99.35

DURATION LISTING OF MONTHLY ENERGY FOR JANUARY (MW.-OP. HOURS)

YEAR	DAYTIME ENERGY (MW)	DAYTIME ACCUMULATED VALUE	NIGHTTIME ENERGY (MW)	NIGHTTIME ACCUMULATED VALUE	TOTAL ENERGY (MW)	TOTAL ACCUMULATED VALUE	PERCENT OF TIME EQUALLED OR EXCEEDED
1948	1935.	1935.	981.	981.	2915.	2915.	.65
1917	1934.	3869.	980.	1961.	2914.	5830.	1.95
1919	1934.	5802.	980.	2941.	2914.	8744.	3.25
1914	1934.	7736.	980.	3921.	2914.	11657.	4.55
1916	1933.	9670.	979.	4901.	2913.	14570.	5.84
1943	1933.	11602.	979.	5880.	2911.	17482.	7.14
1969	1932.	13535.	978.	6858.	2911.	20392.	8.44
1906	1932.	15467.	979.	7837.	2911.	23303.	9.74
1917	1931.	17398.	978.	8815.	2909.	26212.	11.04
1921	1931.	19329.	978.	9793.	2909.	29122.	12.34
1929	1931.	21260.	978.	10770.	2909.	32030.	13.64
1971	1931.	23191.	978.	11748.	2908.	34939.	14.94
1946	1930.	25121.	977.	12726.	2908.	37846.	16.23
1951	1930.	27051.	977.	13703.	2907.	40754.	17.53
1972	1929.	28980.	977.	14680.	2906.	43660.	18.83
1953	1929.	30909.	977.	15658.	2906.	46566.	20.13
1913	1929.	32838.	976.	16634.	2905.	49472.	21.43
1928	1929.	34767.	975.	17609.	2904.	52376.	22.73
1908	1928.	36695.	976.	18585.	2904.	55281.	24.03
1907	1926.	38622.	976.	19561.	2902.	58183.	25.32
1952	1925.	40547.	975.	20536.	2900.	61082.	26.62
1955	1925.	42471.	974.	21510.	2899.	63982.	27.92
1976	1924.	44396.	974.	22485.	2899.	66880.	29.22
1975	1927.	46319.	974.	23459.	2898.	69778.	30.52
1968	1926.	48245.	971.	24430.	2897.	72676.	31.82
1930	1922.	50168.	973.	25404.	2896.	75571.	33.12
1970	1924.	52092.	970.	26377.	2894.	78465.	34.42
1974	1921.	54013.	972.	27346.	2894.	81359.	35.71
1973	1919.	55931.	969.	28315.	2887.	84246.	37.01
1954	1920.	57851.	965.	29281.	2886.	87132.	38.31
1903	1915.	59767.	960.	[illegible]	2875.	90007.	39.61
1949	1910.	61676.	955.	31195.	2865.	92872.	40.91
1920	1907.	63583.	952.	32147.	2859.	95730.	42.21
1951	1906.	65490.	951.	33098.	2857.	98587.	43.51
1944	1906.	67395.	950.	34048.	2856.	101443.	44.81
1958	1902.	69298.	947.	34994.	2849.	104292.	46.10
1950	1901.	71199.	946.	35940.	2847.	107139.	47.40
1905	1901.	73100.	945.	36886.	2847.	109986.	48.70
1967	1894.	74994.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1920	1890.	76884.	974.	[illegible]	[illegible]	[illegible]	[illegible]
1941	1888.	78773.	[illegible]	[illegible]	[illegible]	118463.	[illegible]
1932	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1956	1887.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

DURATION LISTING OF MONTHLY ENERGY FOR JANUARY (MW.-OR. HOURS)

YEAR	DAYTIME ENERGY (MW)	DAYTIME ACCUMULATED VALUE	NIGHTTIME ENERGY (MW)	NIGHTTIME ACCUMULATED VALUE	TOTAL ENERGY (MW)	TOTAL ACCUMULATED VALUE	PERCENT OF TIME EQUALLED OR EXCEEDED
1957	1885.	84433.	929.	42483.	2815.	126916.	56.49
1959	1885.	86318.	928.	43411.	2813.	129729.	57.79
1960	1832.	88200.	926.	44337.	2809.	132538.	59.09
1958	1832.	90082.	926.	45263.	2808.	135345.	60.39
1967	1977.	91960.	921.	46188.	2798.	138144.	61.69
1962	1971.	93831.	915.	47099.	2786.	140930.	62.99
1963	1971.	95702.	915.	48013.	2786.	143716.	64.29
1970	1871.	97573.	914.	48927.	2784.	146500.	65.58
1965	1966.	99439.	910.	49837.	2776.	149276.	66.88
1966	1964.	101303.	907.	50744.	2771.	152047.	68.18
1961	1961.	103164.	904.	51647.	2765.	154811.	69.48
1967	1956.	105020.	896.	52546.	2754.	157565.	70.78
1968	1946.	106866.	892.	53437.	2740.	160306.	72.08
1971	1940.	108706.	883.	54320.	2723.	163029.	73.38
1964	1938.	110547.	880.	55200.	2719.	165747.	74.68
1973	1937.	112384.	879.	56079.	2716.	168463.	75.97
1977	1829.	114213.	871.	56950.	2700.	171163.	77.27
1969	1817.	116030.	868.	57818.	2685.	173836.	78.57
1982	1815.	117845.	865.	58683.	2680.	176578.	79.87
1983	1811.	119656.	851.	59534.	2663.	179170.	81.17
1985	1794.	121450.	832.	60366.	2626.	181796.	82.47
1986	1782.	123233.	821.	61187.	2604.	184400.	83.77
1987	1780.	125013.	818.	61987.	2598.	186998.	85.06
1988	1765.	126778.	799.	62763.	2564.	189561.	86.36
1990	1760.	128538.	793.	63556.	2553.	192114.	87.66
1993	1746.	130284.	777.	64353.	2523.	194637.	88.96
1992	1745.	132029.	775.	65126.	2520.	197157.	90.26
1989	1736.	133765.	765.	65893.	2502.	199659.	91.56
1994	1717.	135483.	744.	66637.	2461.	202120.	92.86
1996	1668.	137151.	689.	67326.	2357.	204477.	94.16
1995	1650.	138801.	670.	67996.	2319.	206796.	95.45
1965	1635.	140436.	654.	68650.	2289.	209086.	96.75
1998	1624.	142060.	640.	69290.	2274.	211359.	98.05
1984	1623.	143687.	641.	69937.	2265.	213624.	99.35

DURATION LISTING OF ANNUAL DAY TOTAL ENERGY

YEAR	ENERGY (MWH)	ACCUMULATED VALUE	PERCENT OF TIME EQUALLED OR EXCEEDED
1973	11198323.87	11198323.87	.65
1974	11178254.37	22376578.25	1.95
1975	11176432.37	33553010.50	3.25
1976	11152331.87	44705342.00	4.55
1929	11107922.87	55813264.50	5.84
1952	11077776.12	66891040.50	7.14
1972	11025105.25	77916145.00	8.44
1917	11004180.00	88920325.00	9.74
1919	10964090.62	99884415.00	11.04
1969	10932912.87	110817327.00	12.34
1913	10930986.50	121748313.00	13.64
1951	10922314.00	132670627.00	14.94
1943	10891982.62	143562608.00	16.23
1930	10883634.12	154446242.00	17.53
1971	10871460.50	165317702.00	18.83
1953	10845150.62	176162852.00	20.13
1967	10836271.62	186999122.00	21.43
1955	10834309.50	197833470.00	22.73
1964	10817841.25	208651270.00	24.03
1968	10816353.25	219467622.00	25.32
1916	10804629.75	230272250.00	26.62
1947	10799460.25	241071710.00	27.92
1954	10787725.25	251859434.00	29.22
1963	10710151.87	262569584.00	30.52
1945	10703400.12	273272984.00	31.82
1948	10691764.75	283964748.00	33.12
1970	10656486.00	294623232.00	34.42
1921	10644643.25	305267872.00	35.71
1926	10632949.87	315900820.00	37.01
1914	10626358.62	326527176.00	38.31
1950	10596283.00	337123456.00	39.61
1956	10589361.12	347712876.00	40.91
1965	10577557.50	358290352.00	42.21
1918	10575763.87	368865752.00	43.51
1968	10551235.75	379416984.00	44.81
1949	10539273.25	389956256.00	46.[illegible]
1946	10530794.25	400487048.00	47.[illegible]
1922	10524127.12	411011172.00	48.7[illegible]
1944	10506705.25	421519476.00	50.[illegible]
1960	10447464.75	431966940.00	51.[illegible]
1928	10446235.37	442417172.00	52.[illegible]
1912	10441898.00	452855066.00	53.[illegible]
1957	10407923.75	463262988.00	55.19

DURATION LISTING OF ANNUAL DAY TOTAL ENERGY

YEAR	ENERGY (MWH)	ACCUMULATED VALUE	PERCENT OF TIME EQUALLED OR EXCEEDED
1920	10386359.87	473651344.00	56.49
1961	10379563.62	484033904.00	57.79
1912	10319429.12	494353572.00	59.09
1902	10256207.62	504608736.00	60.39
1967	10153927.50	514760160.00	61.69
1915	10146965.12	524907072.00	62.99
1924	10129737.37	535036768.00	64.29
1949	10069736.50	545127552.00	65.58
1942	10049759.50	555177264.00	66.88
1938	9974892.75	565152192.00	68.18
1900	9964553.62	575116704.00	69.48
1927	9954176.62	585070776.00	70.78
1927	9932154.00	595002928.00	72.08
1936	9869279.00	604902304.00	73.38
1932	9892300.87	614794608.00	74.68
1937	9865765.37	624660384.00	75.97
1941	9753239.37	634413592.00	77.27
1931	9725848.62	644139440.00	78.57
1933	9697611.87	653837046.00	79.87
1939	9689985.37	663527072.00	81.17
1901	9675720.50	673202752.00	82.47
1940	9664917.25	682867568.00	83.77
1958	9588637.75	692456200.00	85.06
1962	9556883.00	702012688.00	86.36
1966	9550278.12	711562952.00	87.66
1941	9153289.87	720716240.00	88.96
1925	9015579.37	729731816.00	90.26
1916	8874387.87	738606208.00	91.56
1963	8794795.87	747400992.00	92.86
1965	8721897.37	756122888.00	94.16
1935	8539906.50	764662792.00	95.45
1936	8453698.87	773113488.00	96.75
1934	8284951.75	781398432.00	98.05
1964	8273024.06	789671456.00	99.35

AVG.ANNUAL DAYTIME ENERGY= 10255473.37

DURATION LISTING OF ANNUAL NIGHT TOTAL ENERGY

YEAR	ENERGY (MWH)	ACCUMULATED VALUE	PERCENT OF TIME EQUALLED OR EXCEEDED
1975	2875935.16	2875935.16	.65
1989	2864287.03	5740222.19	1.95
1974	2864024.47	8604246.62	3.25
1976	2861974.28	11466220.87	4.55
1972	2860549.03	14326769.87	5.84
1973	2859420.37	17186190.25	7.14
1952	2856395.62	20042585.75	8.44
1917	2849379.19	22891964.75	9.74
1919	2835568.87	25727533.50	11.04
1969	2830678.06	28558211.50	12.34
1951	2828585.69	31386797.00	13.64
1913	2820494.22	34207291.00	14.94
1971	2811980.69	37019271.50	16.23
1943	2809757.75	39829029.00	17.53
1930	2804877.66	42633906.50	18.83
1957	2802412.19	45436318.50	20.13
1967	2799560.34	48235878.50	21.43
1955	2795211.75	51031090.00	22.73
1916	2789607.62	53820697.50	24.03
1908	2786759.66	56607457.00	25.32
1954	2784653.09	59392110.00	26.62
1904	2782353.78	62174463.00	27.92
1947	2764899.37	64939362.00	29.22
1903	2744630.94	67683992.00	30.52
1948	2743297.25	70427289.00	31.82
1970	2739489.28	73166778.00	33.12
1906	2736087.75	75902865.00	34.42
1945	2738576.34	78641441.00	35.71
1921	2734003.16	81378444.00	37.01
1914	2726214.94	84099658.00	38.31
1918	2718256.31	86816914.00	39.61
1950	2715227.31	89532141.00	40.91
1908	2734194.50	92234375.00	42.21
1965	2695693.62	94931978.00	43.51
1956	2691344.28	97623322.00	44.81
1946	2690382.72	100313704.00	46.10
1949	2683055.31	102996759.00	47.40
1922	2673057.25	105669816.00	48.70
1944	2672732.44	108342548.00	50.00
1928	2665657.28	111008205.00	51.30
1961	2649761.88	113657966.00	52.60
1912	2646287.22	116304253.00	53.90
1957	2635678.84	118939931.00	55.19

DURATION LISTING OF ANNUAL NIGHT TOTAL ENERGY

YEAR	ENERGY (MWH)	ACCUMULATED VALUE	PERCENT OF TIME EQUALLED OR EXCEEDED
1920	2632221.06	121571952.00	56.49
1961	2613828.84	124185776.00	57.79
1910	2604094.81	126789870.00	59.09
1902	2588364.25	129378234.00	60.39
1915	2566174.34	131944408.00	61.69
1949	2550556.72	134494964.00	62.99
1967	2541789.00	137036752.00	64.29
1924	2532467.19	139569218.00	65.58
1932	2498791.94	142068008.00	66.88
1942	2489626.97	144557634.00	68.18
1923	2487462.12	147045096.00	69.48
1927	2479280.72	149524376.00	70.78
1900	2474485.53	151998860.00	72.08
1938	2464246.47	154463106.00	73.38
19??	2461198.00	156924304.00	74.68
1937	2458982.34	159383286.00	75.97
1911	2458351.16	161841636.00	77.27
1939	2454740.91	164296376.00	78.57
1901	2438733.75	166735108.00	79.87
1959	2427100.12	169162208.00	81.17
1958	2422707.31	171584914.00	82.47
1933	2422668.12	174007582.00	83.77
1962	2410573.25	176418154.00	85.06
1966	2406379.22	178824532.00	86.36
1941	2395235.78	181219766.00	87.66
1940	2379898.41	183599664.00	88.96
1925	2360681.28	185960344.00	90.26
1926	2259121.50	188199464.00	91.56
1965	2220790.25	190420254.00	92.86
1963	2219547.28	192639800.00	94.16
1935	2148112.28	194787912.00	95.45
1936	2108373.91	196896284.00	96.75
1934	2040504.96	198937188.00	98.05
1964	2026161.37	200963348.00	99.35

AVG.ANNUAL NIGHTTIME ENERGY= 2609913.59

DURATION LISTING OF ANNUAL TOTAL ENERGY

YEAR	ENERGY (MWH)	ACCUMULATED VALUE	PERCENT OF TIME EQUALLED OR EXCEEDED
1973	14057744.12	14057744.12	.65
1975	14052367.50	28110111.50	1.95
1974	14042278.75	42152390.00	3.25
1976	14014306.25	56166696.00	4.55
1979	13972210.00	70138906.00	5.84
1952	13934171.75	84073077.00	7.14
1972	13885654.25	97958731.00	8.44
1917	13853559.25	111812290.00	9.74
1919	13799659.37	125611949.00	11.04
1969	13763597.87	139375538.00	12.34
1913	13751480.75	153127018.00	13.64
1951	13750999.75	166877916.00	14.94
1943	13701740.12	180579656.00	16.23
1930	13698511.75	194268166.00	17.53
1971	13683441.00	207951606.00	19.83
1953	13647562.87	221599168.00	20.13
1947	13635831.87	235234999.00	21.43
1955	13629521.12	248864518.00	22.73
1909	13603112.75	262467630.00	24.03
1904	13600194.62	276067824.00	25.32
1916	13594237.37	289662060.00	26.62
1954	13572378.37	303234438.00	27.92
1947	13564359.62	316798792.00	29.22
1903	13554782.62	330353572.00	30.52
1945	13541976.50	343895548.00	31.82
1942	13435361.75	357330908.00	33.12
1970	13397975.00	370728858.00	34.42
1921	13378646.25	384107224.00	35.71
1906	13372237.62	397779260.00	37.01
1914	13346573.50	410625832.00	38.31
1950	13311512.37	423937340.00	39.61
1918	13293620.00	437230960.00	40.91
1956	13283725.50	450511684.00	42.21
1905	13273200.87	463784884.00	43.51
1908	13255430.25	477040312.00	44.81
1909	13222329.62	490262640.00	46.10
1946	13221176.87	503483816.00	47.40
1922	13197384.25	516681200.00	48.70
1944	13181537.50	529862736.00	50.00
1928	13112792.62	542974128.00	51.30
1960	13096826.50	556070952.00	52.60
1912	13086165.25	569159176.00	53.90
1957	13064602.50	582202736.00	55.19

DURATION LISTING OF ANNUAL TOTAL ENERGY

YEAR	ENERGY (MWH)	ACCUMULATED VALUE	PERCENT OF TIME EQUALLED OR EXCEEDED
1920	13020580.97	595223312.00	56.49
1961	12993388.50	608216696.00	57.79
1910	12923723.75	621140416.00	59.09
1962	12844571.87	633984984.00	60.39
1915	12713059.50	646698040.00	61.69
1967	12695218.50	659393256.00	62.99
1924	12562204.50	672055456.00	64.29
1949	12631293.12	684696744.00	65.58
1942	12539386.50	697236128.00	66.88
1923	12441538.75	709677664.00	68.18
1938	12439139.37	722116800.00	69.48
1900	12439039.12	734555832.00	70.78
1927	12411434.50	746967264.00	72.08
1932	12351092.75	759358352.00	73.38
1939	12354119.87	771712464.00	74.68
1937	12324767.75	784037224.00	75.97
1911	12211560.50	796248784.00	77.27
1931	12187046.75	808435824.00	78.57
1933	12120279.87	820556096.00	79.87
1959	12117085.50	832673176.00	81.17
1901	12114454.37	844787624.00	82.47
1940	12044715.50	856832336.00	83.77
1958	12011344.75	868843680.00	85.06
1962	11967056.12	880810736.00	86.36
1966	11956657.37	892767392.00	87.66
1941	11948525.50	904715912.00	88.96
1925	11356265.50	916672168.00	90.26
1926	11133509.25	926805672.00	91.56
1963	11014343.12	937820008.00	92.86
1965	10942687.50	948762688.00	94.16
1935	10888718.62	959651406.00	95.45
1936	10559172.50	970208976.00	96.75
1934	10325156.62	980534132.00	98.05
1964	10299185.37	990834816.00	99.35

AVG.ANNUAL TOTAL ENERGY= 12865367.12

-326-

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS — BASE CASE CAT1
SAUNDERS OR MOSES PLANT OUTPUT

DATE	LAKE ONTARIO LEVEL (FT)	MW ELEV (FT)	LAKE ONTARIO OUTFLOW (CFS)	DAYTIME ENERGY AVG. OUTPUT (MW)	DAYTIME ENERGY ENERGY (MWH)	NIGHTTIME ENERGY AVG. OUTPUT (MW)	NIGHTTIME ENERGY ENERGY (MWH)	PEAK OUTPUT (MW)	MONTHLY AVERAGE (MW)
1970 JAN	244.29	239.24	210500	688	339264	558	138384	747	642
1970 FEB	244.36	239.23	213250	692	310016	566	126784	755	650
1970 MAR	244.52	238.60	226250	719	356624	595	147560	781	677
	FOREBY ELEVATION IS 242.14 -TOO HIGH. IT HAS BEEN CHANGED TO 242.00 FT.								
1970 APR 01-15	245.21	242.00	229250	767	184080	636	76320	810	723
	FOREBY ELEVATION IS 242.14 -TOO HIGH. IT HAS BEEN CHANGED TO 242.00 FT.								
1970 APR 16-30	245.21	242.00	229250	768	184360	633	75960	807	720
	FOREBY ELEVATION IS 242.27 -TOO HIGH. IT HAS BEEN CHANGED TO 242.00 FT.								
1970 MAY	245.57	242.00	241000	795	394320	664	164672	837	751
	FOREBY ELEVATION IS 243.35 -TOO HIGH. IT HAS BEEN CHANGED TO 242.00 FT.								
1970 JUN	245.76	242.00	213250	715	343200	582	139680	758	670
	FOREBY ELEVATION IS 243.50 -TOO HIGH. IT HAS BEEN CHANGED TO 242.00 FT.								
1970 JUL	245.95	242.00	216750	725	359600	592	146816	768	680
	FOREBY ELEVATION IS 243.63 -TOO HIGH. IT HAS BEEN CHANGED TO 242.00 FT.								
1970 AUG	246.08	242.00	220250	735	364560	603	149544	778	691
	FOREBY ELEVATION IS 242.29 -TOO HIGH. IT HAS BEEN CHANGED TO 242.00 FT.								
1970 SEP	245.65	242.00	243750	802	384960	672	161280	845	758
1970 OCT	245.39	241.35	244750	799	396304	670	166160	841	756
1970 NOV	244.84	241.16	229500	754	361920	624	149760	796	710
1970 DEC 01-15	244.58	240.33	251500	810	194400	684	82080	852	768
1970 DEC 16-31	244.56	240.33	251500	816	208896	690	88320	853	774
1971 JAN	244.22	238.51	220000	708	349184	580	143840	766	662
1971 FEB	243.97	238.03	222000	700	313600	576	129024	761	658
1971 MAR	243.69	238.95	204000	661	327856	535	132680	724	619
1971 APR 01-15	245.15	241.73	239000	792	190080	662	79440	834	748
1971 APR 16-30	245.15	241.73	239000	789	189360	659	79080	832	745
1971 MAY	245.49	241.95	253000	829	410688	699	173352	871	785
1971 JUN	245.74	241.98	255500	838	402240	709	170160	871	795
1971 JUL	245.53	241.76	254500	831	412176	702	174096	869	788
1971 AUG	245.22	241.60	239750	789	391344	659	163432	832	745
1971 SEP	244.94	240.86	249000	806	386880	678	162720	848	763
1971 OCT	244.21	240.33	237500	769	381424	641	158968	811	726
1971 NOV	243.72	240.25	220750	721	346080	592	142080	763	678
1971 DEC 01-15	243.76	240.36	219500	721	173040	592	71040	763	678
1971 DEC 16-31	243.76	240.36	219500	727	186112	598	76544	791	684
1972 JAN	243.91	238.05	216000	694	344224	571	141608	756	653
1972 FEB	243.74	238.19	211250	677	303296	553	123872	739	635
1972 MAR	244.31	238.18	226500	716	355136	593	147064	777	675
1972 APR 01-15	244.97	241.22	241250	793	190320	665	79800	836	750
1972 APR 16-30	244.87	241.22	241250	791	189840	662	79440	833	748
	FOREBY ELEVATION IS 242.04 -TOO HIGH. IT HAS BEEN CHANGED TO 242.00 FT.								
1972 MAY	245.06	242.00	226000	752	372992	620	153760	795	708
	FOREBY ELEVATION IS 242.94 -TOO HIGH. IT HAS BEEN CHANGED TO 242.00 FT.								
1972 JUN	245.49	242.00	215500	721	346080	589	141360	765	677
	FOREBY ELEVATION IS 242.99 -TOO HIGH. IT HAS BEEN CHANGED TO 242.00 FT.								
1972 JUL	246.29	242.00	250500	822	407712	692	171616	869	778
1972 AUG	246.16	241.23	291750	882	437472	882	219736	882	882

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS — BASE CASE CA11
SAUNDERS OR MOSES PLANT OUTPUT — 1900-1976

DURATION LISTING FOR LAKE ONT LEVELS (FT) FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE
1973	245.48	245.48	.65
1928	245.17	490.65	1.95
1974	244.61	735.26	3.25
1960	244.54	979.80	4.55
1955	244.46	1224.26	5.84
1913	244.42	1468.68	7.14
1933	244.35	1713.03	8.44
1951	244.32	1957.35	9.74
1952	244.32	2201.67	11.04
1924	244.31	2445.98	12.34
1930	244.31	2690.29	13.64
1901	244.31	2934.60	14.94
1908	244.31	3178.90	16.23
1912	244.30	3423.20	17.53
1900	244.29	3667.49	18.83
1932	244.29	3911.78	20.13
1968	244.29	4156.07	21.43
1907	244.26	4400.33	22.73
1921	244.26	4644.59	24.03
1976	244.25	4888.84	25.32
1967	244.23	5133.07	26.62
1931	244.22	5377.29	27.92
1946	244.20	5621.49	29.22
1969	244.20	5865.69	30.52
1971	244.19	6109.87	31.82
1943	244.17	6354.04	33.12
1929	244.16	6598.20	34.42
1966	244.15	6842.35	35.71
1927	244.10	7086.45	37.01
1950	244.02	7330.47	38.31
1972	244.02	7574.49	39.61
1906	244.00	7818.49	40.91
1919	243.99	8062.48	42.21
1975	243.93	8306.41	43.51
1902	243.91	8550.32	44.81
1916	243.90	8794.22	46.10
1959	243.88	9038.10	47.40
1953	243.86	9281.96	48.70
1934	243.85	9525.81	50.00
1939	243.79	9769.60	51.30
1942	243.79	10013.39	52.60
1958	243.78	10257.17	53.90
1947	243.75	10500.92	55.19
1949	243.74	10744.66	56.49
1970	243.69	10988.32	57.79
1922	243.67	11231.99	59.09

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS
SAUNDERS OR MOSES PLANT OUTPUT

BASE CASE CA11
1900-1976

DURATION LISTING FOR LAKE ONT LEVELS (FT) FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE	
1903	243.58	11875.57	60.39	
1914	243.58	11719.15	61.69	
1948	243.58	11962.73	62.99	
1918	243.55	12206.28	64.29	
1954	243.55	12449.83	65.58	
1937	243.54	12693.37	66.88	
1917	243.52	12936.89	68.18	
1940	243.48	13180.37	69.48	
1939	243.47	13423.84	70.78	
1957	243.47	13667.31	72.08	
1963	243.44	13910.75	73.38	
1913	243.43	14154.18	74.68	
1945	243.43	14397.61	75.97	
1956	243.43	14641.04	77.27	
1944	243.39	14884.42	78.57	
1911	243.36	15127.78	79.87	
1923	243.34	15371.12	81.17	
1926	243.29	15614.41	82.47	
1905	243.28	15857.69	83.77	
1915	243.25	16100.94	85.06	
1931	243.24	16344.18	86.36	
1923	243.19	16587.38	87.66	
1934	243.09	16830.47	88.96	
1935	243.08	17073.55	90.26	
1919	243.08	17316.47	91.56	
1962	242.94	17559.41	92.86	
1925	242.89	17802.30	94.16	
1961	242.75	18045.05	95.45	
1936	242.75	18287.75	96.75	
1964	242.55	18530.30	98.05	
1965	241.81	18772.11	99.35	AVERAGE VALUE 243.79

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS — BASE CASE CA11
SAUNDERS OR MOSES PLANT OUTPUT — 1900-1976

DURATION LISTING FOR HEAD WATER LEVELS (FT) FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE
1928	240.20	240.20	.65
1920	239.29	479.49	1.95
1967	239.16	718.60	3.25
1932	239.11	957.71	4.55
1960	239.10	1196.81	5.84
1933	238.69	1435.75	7.14
1955	238.95	1674.75	8.44
1913	238.88	1913.63	9.74
1951	238.69	2152.32	11.04
1952	238.69	2391.02	12.34
1924	238.68	2629.69	13.64
1930	238.68	2868.37	14.94
1941	238.68	3107.04	16.23
1973	238.68	3345.72	17.53
1908	238.66	3584.37	18.83
1912	238.66	3823.03	20.13
1950	238.62	4061.65	21.43
1907	238.58	4300.23	22.73
1921	238.58	4538.82	24.03
1959	238.53	4777.35	25.32
1901	238.51	5015.85	26.62
1939	238.48	5254.33	27.92
1946	238.47	5492.80	29.22
1966	238.42	5731.22	30.52
1963	238.41	5969.63	31.82
1929	238.39	6208.03	33.12
1938	238.37	6446.39	34.42
1942	238.37	6684.76	35.71
1927	238.29	6923.04	37.01
1958	238.23	7161.26	38.31
1926	238.09	7399.35	39.61
1919	238.07	7637.42	40.91
1917	238.05	7875.46	42.21
1972	238.04	8113.50	43.51
1949	237.99	8351.49	44.81
1922	237.99	8589.48	46.10
1918	237.99	8827.45	47.40
1923	237.92	9065.37	48.70
1954	237.92	9303.29	50.00
1937	237.92	9541.18	51.30
1917	237.26	9778.44	52.60
1974	237.84	10016.28	53.90
1963	237.82	10254.09	55.19
1953	237.81	10491.91	56.49
1914	237.81	10730.72	57.79
1943	237.79	10968.51	59.09

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS — BASE CASE CAT1
SAUNDERS OR MOSES PLANT OUTPUT — 1900-1976

DURATION LISTING FOR HEAD WATER LEVELS (FT) FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE	
1939	237.76	11205.86	60.39	
1957	237.76	11447.63	61.69	
1947	237.73	11681.36	62.99	
1910	237.69	11919.05	64.29	
1945	237.69	12156.73	65.58	
1956	237.69	12394.42	66.88	
1948	237.63	12632.05	68.18	
1944	237.59	12869.64	69.48	
1911	237.55	13107.19	70.78	
1969	237.54	13344.73	72.08	
1920	237.51	13582.24	73.38	
1926	237.42	13819.66	74.68	
1905	237.40	14057.06	75.97	
1915	237.34	14294.40	77.27	
1931	237.32	14531.72	78.57	
1918	237.30	14769.02	79.87	
1971	237.27	15006.28	81.17	
1970	237.22	15243.50	82.47	
1923	237.04	15480.54	83.77	
1974	237.03	15717.57	85.06	
1935	236.97	15954.54	86.36	
1909	236.93	16191.46	87.66	
1962	236.73	16428.19	88.96	
1968	236.70	16664.89	90.26	
1925	236.63	16901.51	91.56	
1965	236.61	17138.12	92.86	
1976	236.50	17374.63	94.16	
1961	236.34	17610.97	95.45	
1936	236.24	17847.21	96.75	
1964	235.93	18083.15	98.05	
1975	235.69	18318.78	99.35	AVERAGE VALUE 237.91

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS
SAUNDERS OR MOSES PLANT OUTPUT

BASE CASE CAT1
1900-1976

DURATION LISTING FOR LAKE ONT OUTFLOWS(CFS) FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE
1973	250250	250250	.65
1975	245500	495750	1.95
1976	244500	740250	3.25
1968	243500	983750	4.55
1974	238750	1222500	5.84
1971	234500	1457000	7.14
1969	231750	1688750	8.44
1970	222750	1911500	9.74
1972	221000	2132500	11.04
1901	220000	2352500	12.34
1906	220000	2572500	13.64
1907	220000	2792500	14.94
1908	220000	3012500	16.23
1912	220000	3232500	17.53
1913	220000	3452500	18.83
1919	220000	3672500	20.13
1921	220000	3892500	21.43
1924	220000	4112500	22.73
1927	220000	4332500	24.03
1928	220000	4552500	25.32
1929	220000	4772500	26.62
1930	220000	4992500	27.92
1941	220000	5212500	29.22
1943	220000	5432500	30.52
1946	220000	5652500	31.82
1951	220000	5872500	33.12
1952	220000	6092500	34.42
1953	220000	6312500	35.71
1955	220000	6532500	37.01
1950	220000	6752500	38.31
1966	219250	6971750	39.61
1916	218750	7190500	40.91
1918	218500	7409000	42.21
1902	218000	7627000	43.51
1947	218000	7845000	44.81
1933	216250	8061250	46.10
1943	215750	8277000	47.40
1949	215500	8492500	48.70
1932	212500	8705000	50.00
1950	212500	8917500	51.30
1914	212250	9129750	52.60
1922	212250	9342000	53.90
1958	211750	9553750	55.19
1903	210750	9764500	56.49
1900	210500	9975000	57.79
1974	210000	10185000	59.09

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS — BASE CASE CAT1
SAUNDERS OR MOSES PLANT OUTPUT — 1900-1976

DURATION LISTING FOR LAKE ONT OUTFLOWS(CFS) FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE	
1905	210000	10392000	60.39	
1909	210000	10602000	61.69	
1910	210000	10812000	62.99	
1911	210000	11022000	64.29	
1915	210000	11232000	65.58	
1917	210000	11442000	66.88	
1920	210000	11652000	68.18	
1923	210000	11862000	69.48	
1925	210000	12072000	70.78	
1926	210000	12282000	72.08	
1931	210000	12492000	73.38	
1934	210000	12702000	74.68	
1935	210000	12912000	75.97	
1936	210000	13122000	77.27	
1937	210000	13332000	78.57	
1938	210000	13542000	79.87	
1939	210000	13752000	81.17	
1940	210000	13962000	82.47	
1942	210000	14172000	83.77	
1944	210000	14382000	85.06	
1945	210000	14592000	86.36	
1954	210000	14802000	87.66	
1956	210000	15012000	88.96	
1957	210000	15222000	90.26	
1959	210000	15432000	91.56	
1961	210000	15642000	92.86	
1962	210000	15852000	94.16	
1964	210000	16062000	95.45	
1967	210000	16272000	96.75	
1963	208500	16480500	98.05	
1965	184750	16665250	99.35	AVERAGE VALUE 216432

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS
SAUNDERS OR MOSES PLANT OUTPUT

BASE CASE CAT1
1900-1976

DURATION LISTING FOR DAYTIME ENERGY (MW) FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE
1973	787	787	.65
1958	749	1536	1.95
1976	749	2285	3.25
1974	748	3033	4.55
1975	743	3776	5.94
1971	731	4507	7.14
1969	726	5233	8.44
1928	719	5952	9.74
1960	709	6661	11.04
1955	708	7369	12.34
1913	707	8076	13.64
1924	706	8782	14.94
1930	706	9488	16.23
1941	706	10194	17.53
1951	706	10900	18.83
1952	706	11606	20.13
1907	705	12311	21.43
1908	705	13016	22.73
1912	705	13721	24.03
1921	705	14426	25.32
1901	704	15130	26.62
1946	704	15834	27.92
1929	703	16537	29.22
1943	703	17240	30.52
1927	702	17942	31.82
1972	702	18644	33.12
1966	701	19345	34.42
1906	700	20045	35.71
1919	700	20745	37.01
1970	699	21444	38.31
1933	698	22142	39.61
1953	698	22840	40.91
1916	696	23536	42.21
1902	694	24230	43.51
1967	692	24922	44.81
1918	689	25611	46.10
1932	689	26300	47.40
1950	685	26985	48.70
1920	684	27669	50.00
1948	682	28351	51.30
1949	682	29033	52.60
1967	682	29715	53.90
1958	679	30394	55.19
1922	678	31072	56.49
1914	677	31749	57.79
1934	677	32426	59.09

SB4-

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS — BASE CASE CAT1
SAUNDERS OR MOSES PLANT OUTPUT — 1900-1976

DURATION LISTING FOR DAYTIME ENERGY (MW) FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE	
1959	677	33103	60.39	
1938	676	33779	61.69	
1942	676	34455	62.99	
1903	674	35129	64.29	
1954	672	35801	65.58	
1917	671	36472	66.88	
1937	671	37143	68.18	
1910	670	37813	69.48	
1939	670	38483	70.78	
1940	670	39153	72.08	
1945	670	39823	73.38	
1956	670	40493	74.68	
1957	670	41163	75.97	
1949	669	41832	77.27	
1911	668	42500	78.57	
1920	668	43168	79.87	
1935	667	43835	81.17	
1926	667	44502	82.47	
1963	667	45169	83.77	
1915	666	45835	85.06	
1931	666	46501	86.36	
1934	666	47165	87.66	
1923	666	47829	88.96	
1909	663	48492	90.26	
1935	663	49155	91.56	
1962	661	49816	92.86	
1925	660	50476	94.16	
1961	659	51134	95.45	
1936	657	51791	96.75	
1964	654	52445	98.05	
1965	592	53037	99.35	AVERAGE VALUE 689

385

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS
SAUNDERS OR MOSES PLANT OUTPUT

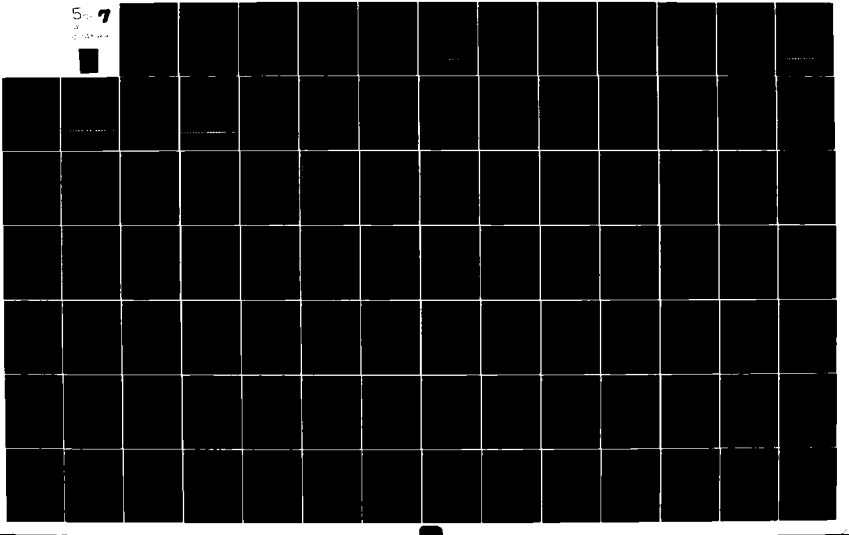
BASE CASE CAT1
1900-1976

DURATION LISTING FOR NIGHTTIME ENERGY (MW) FOR JANUARY

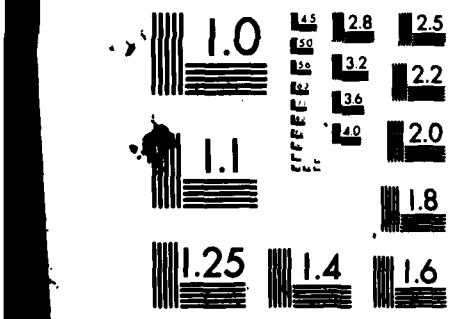
YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE
1973	665	665	.65
1976	631	1296	1.95
1968	630	1926	3.25
1974	627	2553	4.55
1975	626	3179	5.84
1971	610	3789	7.14
1965	605	4394	8.44
1928	592	4986	9.74
1960	589	5575	11.04
1955	563	6138	12.34
1913	587	6735	13.64
1908	581	7316	14.94
1912	581	7897	16.23
1924	581	8478	17.53
1930	581	9059	18.83
1941	581	9640	20.13
1951	581	10221	21.43
1952	581	10802	22.73
1901	580	11382	24.03
1907	580	11962	25.32
1921	580	12542	26.62
1925	579	13121	27.92
1943	579	13700	29.22
1946	579	14279	30.52
1972	579	14858	31.82
1927	578	15436	33.12
1970	578	16014	34.42
1976	577	16591	35.71
1919	577	17168	37.01
1966	577	17745	38.31
1953	575	18320	39.61
1933	573	18893	40.91
1916	572	19465	42.21
1902	571	20036	43.51
1947	569	20605	44.81
1918	567	21172	46.10
1932	563	21735	47.40
1948	559	22294	48.70
1950	559	22853	50.00
1900	558	23411	51.30
1949	558	23969	52.60
1967	556	24525	53.90
1958	555	25080	55.19
1922	554	25634	56.49
1914	553	26187	57.79
1959	552	26739	59.09

AD-A114 589 INTERNATIONAL LAKE ERIE REGULATION STUDY BOARD F/G 13/2
LAKE ERIE WATER LEVEL STUDY. APPENDIX E. POWER. ANNEX D. COMPUT--ETC(U)
JUL 81

UNCLASSIFIED NL



1458



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS — BASE CASE CAT1
SAUNDERS OR MOSES PLANT OUTPUT — 1900-1976

DURATION LISTING FOR NIGHTTIME ENERGY (MW) FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE	
1934	551	27290	60.39	
1938	551	27841	61.69	
1942	551	28392	62.99	
1903	550	28942	64.29	
1917	547	29489	65.58	
1937	547	30036	66.88	
1940	547	30583	68.18	
1954	547	31130	69.48	
1910	546	31676	70.78	
1939	546	32222	72.08	
1945	546	32768	73.38	
1956	546	33314	74.68	
1957	546	33860	75.97	
1911	545	34405	77.27	
1920	545	34950	78.57	
1944	545	35495	79.87	
1905	544	36039	81.17	
1915	544	36583	82.47	
1926	544	37127	83.77	
1931	543	37670	85.06	
1963	543	38213	86.36	
1923	542	38755	87.66	
1934	541	39296	88.96	
1909	541	39837	90.26	
1935	541	40378	91.56	
1925	539	40917	92.86	
1962	539	41456	94.16	
1961	537	41993	95.45	
1936	536	42529	96.75	
1964	534	43063	98.05	
1965	468	43531	99.35	AVERAGE VALUE 565

-187-

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS — BASE CASE CAT1
SAUNDERS OR MOSES PLANT OUTPUT — 1900-1976

DURATION LISTING FOR PEAK PLANT OUTPUT (MW) FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE
1973	826	826	.65
1974	808	1634	1.95
1968	804	2438	3.25
1976	802	3240	4.55
1975	792	4032	5.84
1971	791	4823	7.14
1969	787	5610	8.44
1928	783	6393	9.74
1960	772	7165	11.04
1913	770	7935	12.34
1955	770	8705	13.64
1951	768	9473	14.94
1952	768	10241	16.23
1907	767	11008	17.53
1908	767	11775	18.83
1912	767	12542	20.13
1921	767	13309	21.43
1924	767	14076	22.73
1930	767	14843	24.03
1941	767	15610	25.32
1901	766	16376	26.62
1929	765	17141	27.92
1943	765	17906	29.22
1946	765	18671	30.52
1972	764	19435	31.82
1927	763	20198	33.12
1966	763	20961	34.42
1936	761	21722	35.71
1919	761	22483	37.01
1933	761	23244	38.31
1970	760	24004	39.61
1953	759	24763	40.91
1916	757	25520	42.21
1902	756	26276	43.51
1947	753	27029	44.81
1932	752	27781	46.10
1918	750	28531	47.40
1900	747	29276	48.70
1950	747	30025	50.00
1967	745	30770	51.30
1948	743	31513	52.60
1949	743	32256	53.90
1958	741	32997	55.19
1922	740	33737	56.49
1934	739	34476	57.79
1959	739	35215	59.09

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS
SAUNDERS OR MOSES PLANT OUTPUT

BASE CASE CAT1
1900-1976

DURATION LISTING FOR PEAK PLANT OUTPUT (MW) FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE
1914	738	35953	60.39
1938	738	36691	61.69
1942	738	37429	62.99
1903	735	38164	64.29
1917	733	38897	65.58
1937	733	39630	66.88
1954	733	40363	68.18
1939	732	41095	69.48
1940	732	41827	70.78
1957	732	42559	72.08
1910	731	43290	73.38
1945	731	44021	74.68
1956	731	44752	75.97
1911	730	45482	77.27
1944	730	46212	78.57
1920	729	46941	79.87
1905	728	47669	81.17
1915	729	48397	82.47
1926	728	49125	83.77
1963	728	49853	85.06
1931	727	50580	86.36
1904	725	51305	87.66
1923	725	52030	88.96
1909	724	52754	90.26
1935	724	53478	91.56
1962	722	54200	92.86
1925	721	54921	94.16
1961	718	55639	[illegible]
1936	717	56356	[illegible]
1964	714	57070	[illegible]
1965	654	57724	[illegible]

PAGE VALUE 750

-389-

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS — BASE CASE CAT1
SAUNDERS OR MOSES PLANT OUTPUT — 1900-1976

DURATION LISTING FOR AVERAGE MONTHLY ENERGY FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE
1973	746	746	.65
1968	709	1455	1.95
1976	709	2164	3.25
1974	707	2871	4.55
1975	704	3575	5.84
1971	690	4265	7.14
1969	685	4950	8.44
1928	676	5626	9.74
1960	667	6293	11.04
1955	666	6959	12.34
1913	665	7624	13.64
1924	664	8288	14.94
1930	664	8952	16.23
1941	664	9616	17.53
1951	664	10280	18.83
1952	664	10944	20.13
1907	663	11607	21.43
1908	663	12270	22.73
1912	663	12933	24.03
1921	663	13596	25.32
1931	662	14258	26.62
1946	662	14920	27.92
1929	661	15581	29.22
1943	661	16242	30.52
1972	661	16903	31.82
1927	660	17563	33.12
1926	659	18222	34.42
1919	659	18881	35.71
1966	659	19540	37.01
1970	658	20198	38.31
1953	657	20855	39.61
1933	656	21511	40.91
1916	654	22165	42.21
1902	653	22818	43.51
1967	651	23469	44.81
1918	648	24117	46.10
1932	647	24764	47.40
1950	643	25407	48.70
1900	642	26049	50.00
1948	641	26690	51.30
1949	640	27330	52.60
1967	640	27970	53.90
1958	637	28607	55.19
1922	636	29243	56.49
1914	635	29878	57.79
1934	635	30513	59.09

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS
SAUNDERS OR MOSES PLANT OUTPUT

BASE CASE CAT1
1900-1976

DURATION LISTING FOR AVERAGE MONTHLY ENERGY FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE	
1959	635	31148	60.39	
1938	634	31782	61.69	
1942	634	32416	62.99	
1923	632	33048	64.29	
1954	630	33678	65.58	
1917	629	34307	66.88	
1937	629	34936	68.18	
1940	629	35565	69.48	
1910	628	36193	70.78	
1939	628	36821	72.08	
1945	628	37449	73.38	
1956	628	38077	74.68	
1957	628	38705	75.97	
1911	627	39332	77.27	
1920	627	39959	78.57	
1944	627	40586	79.87	
1905	626	41212	81.17	
1926	626	41838	82.47	
1935	625	42463	83.77	
1931	625	43088	85.06	
1963	625	43713	86.36	
1924	627	44336	87.66	
1923	623	44959	88.96	
1909	622	45581	90.26	
1935	622	46203	91.56	
1962	620	46823	92.86	
1925	619	47442	94.16	
1961	617	48059	95.45	
1936	616	48675	96.75	
1964	614	49289	98.05	
1965	550	49839	99.35	AVERAGE VALUE 647

-68-

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS — BASE CASE CAT1
SAUNDERS OR MOSES PLANT OUTPUT — 1900-1976

DURATION LISTING FOR TOTAL PLANT MWH OUTPUT FOR WHOLE YEAR

YEAR	DAYTIME ENERGY(MWH)	DAYTIME ACCUMULATED VALUE	NIGHTTIME ENERGY(MWH)	NIGHTTIME ACCUMULATED VALUE	TOTAL ENERGY(MWH)	TOTAL ACCUMULATED VALUE	PERCENTAGE
1973	5030976	5030976	2954016	2954016	7984992	7984992	.65
1974	4960720	9991696	2408904	4862920	7369624	14854616	1.95
1976	4965456	14957152	2395056	7257976	7360512	22215128	3.25
1972	4910608	19867760	2319616	9577592	7230224	29445352	4.55
1975	4858688	24726448	2338536	11916128	7197224	36642576	5.84
1929	4890320	29616768	2288992	14205120	7179312	43821888	7.14
1952	4876016	34492784	2289104	16494224	7165120	50987008	8.44
1951	4853888	39346672	2251144	18745368	7105032	58092040	9.74
1943	4948064	44194736	2213736	20959104	7061800	65153840	11.04
1947	4813792	49008528	2213296	23172400	7027088	72180928	12.34
1913	4778032	53786560	2159216	25331616	6937248	79118176	13.64
1930	4735536	58522096	2173224	27504840	6908760	86026936	14.94
1945	4723536	63245632	2183824	29688664	6907360	92934296	16.23
1939	4737568	67983200	2161056	31849720	6898624	99832920	17.53
1955	4764256	72747456	2128840	33978560	6893096	106726016	18.83
1917	4724416	77471872	2152800	36131360	6877216	113603232	20.13
1928	4787952	82259824	2042448	38173808	6850400	120453632	21.43
1969	4733456	86993280	2111696	40305504	6845152	127298784	22.73
1904	4689168	91682448	2150160	42455664	6839328	134138112	24.03
1971	4755232	96437680	2059664	44515328	6814896	140953008	25.32
1919	4707264	101144944	2106024	46621352	6813288	147766296	26.62
1912	4731328	105876272	2065552	48686904	6796880	154563176	27.92
1916	4692912	110569184	2098744	50785648	6791656	161354832	29.22
1954	4712832	115282016	2076064	52861712	6788896	168143728	30.52
1950	4705280	119987296	2080360	54942072	6713640	174857368	31.82
1937	4659824	124647120	2003384	56873456	6703208	181560576	33.12
1960	4641056	129328176	2015400	58888856	6656456	188217032	34.42
1953	4654000	133982176	1993024	60881880	6647024	194864056	35.71
1903	4644096	138626272	1993800	62875680	6637896	201501952	37.01
1948	4595744	143222016	1991000	64866680	6586744	208088696	38.31
1968	4633376	147855392	1949528	66816208	6582904	214671600	39.61
1918	4615040	152470432	1952312	68768520	6567352	221238952	40.91
1956	4582768	157053200	1977616	70746136	6560384	227799336	42.21
1970	4598400	161651600	1932536	72678672	6530936	234330272	43.51
1922	4562256	166213856	1950904	74629576	6513160	240843432	44.81
1902	4530528	170744384	1968008	76597584	6498536	247341968	46.10
1906	4554096	175298480	1910952	78508536	6465048	253807016	47.40
1905	4484192	179782672	1957952	80466488	6442144	260249160	48.70
1924	4534112	184316784	1895408	82361896	6429520	266678680	50.00
1914	4526664	188843448	1895648	84257544	6422512	273101192	51.30
1909	4496416	193340064	1923528	86181072	6419944	279521136	52.60
1921	4517856	197857920	1890832	88071904	6408688	285929824	53.90
1946	4497440	202355360	1882064	89953968	6379504	292309328	55.19
1942	4466624	206821984	1859864	91813832	6326488	298635816	56.49
1932	4463232	211285216	1857232	93671064	6325264	304961080	57.79
1967	4448128	215733344	1871008	95542072	6319128	311280208	59.09

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS — BASE CASE CAT1
SAUNDERS OR MOSES PLANT OUTPUT — 1900-1976

DURATION LISTING FOR TOTAL PLANT MWH OUTPUT FOR WHOLE YEAR

YEAR	DAYTIME ENERGY(MWH)	DAYTIME ACCUMULATED VALUE	NIGHTTIME ENERGY(MWH)	NIGHTTIME ACCUMULATED VALUE	TOTAL ENERGY(MWH)	TOTAL ACCUMULATED VALUE	PERCENTAGE
1901	4863064	2201982C4	1856456	97398520	6316520	3175967Z4	60.39
1910	4887520	224645728	1852168	99250688	6299688	323896416	61.69
1944	4838432	229484160	1847840	101098528	6286272	330182688	62.99
1927	4791760	233475920	1824760	102923288	6216520	336399208	64.29
1903	4381504	237857424	1813320	104736608	6194824	3425940Q2	65.58
1959	4371296	242228720	1808448	106545056	6179744	348773776	66.88
1938	4366144	246594864	1807304	108352360	6173448	354947224	68.18
1926	4358000	250952864	1805416	110157776	6163416	3611104C	69.48
1957	4349648	255302512	1801472	111959248	6151120	367261760	70.78
1961	4331008	259633520	1794072	113753320	6125080	37338684C	72.08
1937	4323392	263956912	1786032	115539352	6109424	379496264	73.38
1915	4298960	268255872	1778760	117318112	6077720	385573984	74.68
1949	4255616	272551488	1773376	119091488	6028992	391602936	75.97
1940	4234512	276786000	1739968	120831216	5974480	397617216	77.27
1939	4229904	281015904	1735904	122567120	5965808	4035830Z4	78.57
1926	4220560	285236464	1734640	124301760	5955200	409538224	79.87
1933	4216976	289453440	1727664	126029424	5944640	415483064	81.17
1923	4213584	293663984	1726928	127756552	5937472	421420536	82.47
1966	4183112	297846096	1711352	129467904	5891464	427312000	83.77
1911	4160544	302004640	1701584	131169488	5862128	433174128	85.06
1958	4149264	306153904	1693896	132863384	5843160	439017288	86.36
1925	4140720	310298624	1697184	134560568	5841904	444859192	87.66
1941	4067824	314366448	1652472	136213040	5720296	450579488	88.96
1931	4065344	318431792	1652992	137866032	5718336	456297824	90.26
1962	4039656	322470448	1640104	139506136	5678760	461976584	91.56
1936	3986656	326457104	1614344	141120480	5601000	467577584	92.86
1963	3982320	330439424	1611232	142731712	5593552	473171136	94.16
1935	3891152	334330576	1565864	144297576	5457016	478628152	95.45
1934	3887856	33821Q432	1559744	145857320	5447600	484075752	96.75
1964	3813840	342U32272	1527928	147385248	5341768	489417520	98.05
1965	3791504	345823776	1511576	148896824	5303080	494720600	99.35
AVERAGE VALUE	4091218		1933725		6024943		

-56-

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS — BASE CASE CAT1
TOTAL CANADIAN OUTPUT FOR ST LAWRENCE, ST MARYS AND NIAGARA RIVER PLANTS — 1900-1976

DURATION LISTING FOR TOTAL ANNUAL ENERGY (MWH)

YEAR	DAYTIME ENERGY(MWH)	DAYTIME ACCUMULATED VALUE	NIGHTTIME ENERGY(MWH)	NIGHTTIME ACCUMULATED VALUE	TOTAL ENERGY(MWH)	TOTAL ACCUMULATED VALUE	PERCENTAGE
1975	16479408	16479408	5438488	5438488	21917896	21917896	.65
1974	16391376	32870784	5398472	10836960	21789848	43707744	1.95
1976	16365000	49235792	5383016	16219974	21748024	65475768	3.25
1975	16252144	65507936	5330496	21550472	21582640	87056408	4.55
1972	16232176	81740112	5321080	26871552	21553256	108611664	5.84
1929	16244512	97984624	5276904	32148454	21521416	130133080	7.14
1952	16237008	114221632	5279624	37428080	21516632	151649712	8.44
1951	16011136	130232768	5204672	42632752	21215808	172865520	9.74
1917	15965536	146216552	5130672	47763424	21116256	193981776	11.04
1943	15969376	162187728	5146576	52910000	21115952	215097728	12.34
1913	15964880	178152608	5107512	58017512	21072392	236170120	13.64
1969	15937184	194089792	5078096	63095608	21015272	257185392	14.94
1930	15879192	209967984	5107696	68203296	20985888	278171280	16.23
1947	15856048	225824032	5107792	73311088	20963752	299135032	17.53
1919	15982096	241706128	5054888	78365968	20936984	320072016	18.83
1908	15844224	257550352	5084992	83450860	20929216	341001232	20.13
1904	15802480	273352832	5073052	88523912	20875512	361876744	21.43
1935	15827680	289180512	5046024	93569936	20873704	382750448	22.73
1971	15863296	305043808	4997744	98567680	20861040	403611488	24.03
1916	15796448	320840256	5030440	103598120	20826888	424438376	25.32
1945	15699680	336539936	5058448	108656560	20758128	445196496	26.62
1954	15756432	352296368	4988872	113645432	20745304	465941800	27.92
1907	15770352	368066720	4928296	118573728	20698648	486640448	29.22
1953	15748048	383814768	4919664	123493392	20667712	507308160	30.52
1903	15596160	399410928	4867088	128360480	20463248	527771408	31.82
1948	15579552	414990480	4871736	133232216	20451288	548222696	33.12
1950	15573904	430564384	4860264	138092480	20434168	568656864	34.42
1928	15534064	446098448	4870568	142963048	20404632	589061496	35.71
1970	15525632	461624080	4806912	147769960	20332544	609394040	37.01
1912	15459008	477083088	4847416	152617376	20306424	629700464	38.31
1968	15488960	492572048	4797656	157415032	20286616	649987080	39.61
1956	15463488	508035536	4806400	162221432	20269888	670256969	40.91
1906	15460192	523495728	4787336	167008768	20247528	690504496	42.21
1918	15446464	538942192	4799304	171808072	20245768	710750264	43.51
1914	15427584	554369776	4753208	176561280	20180792	730931056	44.81
1960	15372352	569742128	4799808	181360888	20171960	751103016	46.10
1929	15416560	585158688	4751944	186112832	20168504	771271520	47.40
1905	15330432	600489120	4737488	190900320	20117920	791389440	48.70
1909	15305808	615794928	4740992	195641312	20046800	811436240	50.00
1922	15306736	631101664	4733904	200375216	20040640	831476880	51.30
1946	15303008	646404672	4709792	205084968	20012760	851489640	52.60
1944	15247008	661651680	4682528	209747496	19909536	871399176	53.90
1902	15058736	676710416	4692176	214439672	19750912	891150088	55.19
1910	15017824	691728240	4581528	219021200	19599352	910749440	56.49
1957	15019536	706747776	4568624	223589824	19588160	930337600	57.79
1920	15020752	721768528	4567024	228156848	19587776	949925376	59.09

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS
TOTAL CANADIAN OUTPUT FOR ST LAWRENCE, ST MARYS AND NIAGARA RIVER PLANTS

BASE CASE CAT1
1900-1976

DURATION LISTING FOR TOTAL ANNUAL ENERGY (MWH)

	DAYTIME		NIGHTTIME		TOTAL		
YEAR	ENERGY(MWH)	ACCUMULATED VALUE	ENERGY(MWH)	ACCUMULATED VALUE	ENERGY(MWH)	ACCUMULATED VALUE	PERCENTAGE
1961	14970080	736778608	4537104	232693952	19507184	969432560	60.39
1924	14913563	751652176	4545256	237239208	19458824	988891384	61.69
1967	14840043	766492224	4538960	241778168	19379008	1008270392	62.99
1942	14792032	781284256	4467432	246263600	19279464	1027549856	64.29
1915	14690944	795973200	4475384	250740984	19166328	1046716184	65.58
1932	14662125	810637328	4500512	255241496	19162640	1065878824	66.88
1949	14661504	825298832	4461696	259703192	19123200	1085002024	68.18
1902	14630704	839929536	4429560	264132752	19060264	1104062288	69.48
1938	14616672	854546208	4408728	268541480	19025400	1123087688	70.78
1927	14565120	869111328	4432936	272974416	18998056	1142085744	72.08
1901	14400775	883521104	4432384	277406800	18842160	1160927904	73.38
1937	14454352	897975456	4377296	281784096	18831648	1179759552	74.68
1939	14374064	912349520	4320976	286105032	18695000	1198454552	75.97
1923	14354064	926703584	4318472	290423504	18675336	1217129888	77.27
1953	14303256	941011440	4365032	294788536	18670088	1235799976	78.57
1977	14183160	955194600	4285312	299073848	18468480	1254268456	79.87
1946	14165648	969360256	4255240	303329088	18440888	1272709344	81.17
1911	14130944	983511200	4276208	307605296	18407152	1291116496	82.47
1966	14[illegible]634	997317824	4255840	311861144	18262472	1309378968	83.77
1955	14[illegible]	1011525912	4253016	316114160	18262104	1327641072	85.06
1971	14[illegible]	1025547120	4236416	320350576	18256624	1345897696	86.36
1962	1[illegible]	1039[illegible]2416	4181176	324531752	18036472	1363934168	87.66
1941	1[illegible]	1052[illegible]	4179536	328711288	17663920	1381598088	88.96
1925	1[illegible]	1066275[illegible]	4152456	332863744	17541544	1399139632	90.26
1925	1[illegible]	1079[illegible]176	4113024	336976768	17447312	1416586944	91.56
1963	1[illegible]11472	1092621648	3955952	340932720	16967424	1433554368	92.86
1965	12794816	1105415664	3872872	344805592	16666688	1450221256	94.16
1976	12730048	1118145712	3861288	348666880	16591336	1466812592	95.45
1975	12652320	1130828032	3847232	352514112	16529552	1483342144	96.75
1934	12449376	1143277408	3739144	356253256	16188520	1499530664	98.05
1964	12387152	1155664560	3695968	359949224	16083120	1515613784	99.35
AVERAGE VALUE	15008631		4674665		19683296		

@FREE,A 17.

@USE 17.,DECOLT.

@XQT SUMMARY.XQT

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS — BASE CASE CAT1
TOTAL CANADIAN OUTPUT FOR ST LAWRENCE, ST MARYS AND NIAGARA RIVER PLANTS — 1900-1976

DURATION LISTING FOR AVERAGE MONTHLY ENERGY FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE
1973	2392	2392	.65
1968	2361	4753	1.29
1976	2360	7113	3.25
1975	2357	9470	4.55
1974	2355	11825	5.84
1971	2350	14175	7.14
1969	2348	16523	8.44
1928	2333	18856	9.76
1951	2323	21179	11.04
1943	2322	23501	12.34
1921	2321	25822	13.64
1929	2320	28142	14.94
1946	2320	30462	16.23
1906	2319	32781	17.53
1952	2319	35100	18.83
1972	2319	37419	20.13
1907	2318	39737	21.43
1919	2318	42055	22.73
1908	2317	44372	24.03
1916	2316	46688	25.32
1917	2315	49003	26.62
1930	2313	51316	27.92
1955	2311	53627	29.22
1970	2309	55936	30.52
1918	2307	58243	31.82
1953	2306	60549	33.12
1948	2302	62851	34.42
1914	2298	65149	35.71
1917	2292	67441	37.01
1960	2287	69728	38.31
1949	2276	72004	39.61
1954	2276	74280	40.91
1903	2275	76555	42.21
1941	2272	78827	43.51
1950	2271	81098	44.81
1924	2266	83364	46.10
1956	2265	85629	47.40
1922	2262	87891	48.70
1932	2262	90153	50.00
1912	2260	92413	51.30
1944	2258	94671	52.60
1931	2257	96928	53.90
1947	2256	99184	55.19
1901	2253	101437	56.49
1905	2253	103690	57.79
1956	2244	105934	59.09

-96-

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS — BASE CASE CAT1
TOTAL CANADIAN OUTPUT FOR ST LAWRENCE, ST MARYS AND NIAGARA RIVER PLANTS — 1900-1976

DURATION LISTING FOR AVERAGE MONTHLY ENERGY FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE		
1957	2239	106173	60.39		
1920	2236	110409	61.69		
1909	2232	112641	62.99		
1904	2231	114872	64.29		
1902	2228	117100	65.58		
1910	2226	119326	66.88		
1967	2221	121549	68.18		
1945	2220	123769	69.48		
1915	2218	125987	70.78		
1933	2218	128205	72.08		
1927	2215	130420	73.38		
1923	2214	132634	74.68		
1911	2186	134820	75.97		
1900	2184	137004	77.27		
1951	2180	139184	78.57		
1939	2173	141357	79.87		
1966	2168	143525	81.17		
1962	2159	145684	82.47		
1925	2131	147815	83.77		
1937	2127	149942	85.06		
1958	2122	152064	86.36		
1940	2111	154175	87.66		
1942	2102	156277	88.96		
1959	2093	158370	90.26		
1963	2088	160458	91.56		
1934	2072	162530	92.86		
1926	2006	164536	94.16		
1935	1991	166527	95.45		
1936	1963	168490	96.75		
1964	1954	170444	98.05		
1965	1905	172349	99.35	AVERAGE VALUE	2238

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS
TOTAL CANADIAN OUTPUT FOR ST LAWRENCE, ST MARYS AND NIAGARA RIVER PLANTS

EASF CASE CAT1
1900-1976

DURATION DISTINCT FOR NIGHTTIME ENERGY(AV.MW) FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE
[illegible]	[illegible]	[illegible]	.65
[illegible]	[illegible]	[illegible]	1.95
[illegible]	[illegible]	4972	3.25
[illegible]	1645	6617	4.55
[illegible]	1642	8259	5.84
1971	1634	9893	7.14
[illegible]	1631	11524	8.44
1928	1612	13136	9.74
1951	1604	14740	11.04
1943	1603	16343	12.34
1906	1602	17945	13.64
1921	1602	19547	14.94
1929	1602	21149	16.23
1952	1602	22751	17.53
1972	1602	24353	18.83
1907	1601	25954	20.13
1919	1601	27555	21.43
1946	1601	29156	22.73
1905	1600	30756	24.03
1916	1597	32353	25.32
1930	1597	33950	26.62
1913	1596	35546	27.92
1955	1594	37140	29.22
1970	1592	38732	30.52
1918	1590	40322	31.82
1953	1589	41911	33.12
1948	1584	43495	34.42
1914	1579	45074	35.71
1917	1573	46647	37.01
1960	1566	48213	38.31
1949	1557	49770	39.61
1903	1556	51326	40.91
1954	1556	52882	42.21
1941	1551	54433	43.51
1950	1550	55983	44.81
1958	1546	57529	46.10
1924	1545	59074	47.40
1922	1543	60617	48.70
1932	1541	62158	50.00
1912	1540	63698	51.30
1931	1538	65236	52.60
1944	1538	66774	53.90
1947	1537	68311	55.19
1905	1534	69845	56.49
1901	1532	71377	57.79
1956	1524	72901	59.09

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS
TOTAL CANADIAN OUTPUT FOR ST LAWRENCE, ST MARYS AND NIAGARA RIVER PLANTS

BASE CASE CAT1
1900-1976

DURATION LISTING FOR NIGHTTIME ENERGY(AV.MW) FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE
1957	1519	74420	60.39
1920	1517	75937	61.69
1919	1513	77450	62.99
1904	1512	78962	64.29
1902	1508	80470	65.58
1910	1507	81977	66.88
1915	1499	83476	68.18
1945	1499	84975	69.48
1967	1498	86473	70.78
1973	1494	87966	72.08
1955	1495	89464	73.38
1927	1494	90958	74.68
1911	1466	92424	75.97
1961	1461	93885	77.27
1950	1460	95345	78.57
1939	1451	96796	79.87
1966	1444	98240	81.17
1962	1437	99678	82.47
1925	1439	101117	83.77
1937	1402	102439	85.06
1926	1395	103884	86.36
1940	1384	105268	87.66
1942	1372	106640	88.96
1959	1362	108002	90.26
1963	1359	109361	91.56
1934	1339	110700	92.86
1926	1271	111971	94.16
1935	1256	113227	95.45
1936	1228	114455	96.75
1964	1219	115674	98.05
1965	1168	116842	99.35

AVERAGE VALUE 1517

VALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS
TOTAL CANADIAN OUTPUT FOR ST LAWRENCE, ST MARYS AND NIAGARA RIVER PLANTS

BASE CASE CAT1
1900-1976

[illegible] LISTING FOR DAYTIME ENERGY(AV. MW) FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE
[illegible]	[illegible]	2749	[illegible]
[illegible]	[illegible]	[illegible]	1.95
[illegible]	[illegible]	[illegible]	3.25
[illegible]	[illegible]	[illegible]	4.55
[illegible]	[illegible]	[illegible]	5.84
[illegible]	[illegible]	[illegible]	7.14
[illegible]	2706	[illegible]	8.44
[illegible]	[illegible]	21715	9.74
[illegible]	2682	24397	11.04
[illegible]	[illegible]	27078	12.34
[illegible]	[illegible]	29758	13.64
1929	2679	32437	14.94
1946	2679	35116	16.23
1906	2679	37794	17.53
1919	2677	40471	18.83
1952	2677	43148	20.13
1972	2677	45825	21.43
1907	2676	48501	22.73
1908	2676	51177	24.03
1916	2675	53852	25.32
1913	2674	56526	26.62
1930	2671	59197	27.92
1955	2670	61867	29.22
1970	2667	64534	30.52
1918	2666	67200	31.82
1953	2664	69864	33.12
1948	2661	72525	34.42
1914	2657	75182	35.71
1917	2651	77833	37.01
1960	2647	80480	38.31
1949	2636	83116	39.61
1954	2636	85752	40.91
[illegible]	2635	88387	42.21
1941	2632	91019	43.51
1950	2631	93650	44.81
1924	2627	96277	46.10
1958	2625	98902	47.40
1932	2623	101525	48.70
1922	2622	104147	50.00
1912	2620	106767	51.30
1944	2618	109385	52.60
1931	2616	112001	53.90
1947	2616	114617	55.19
1901	2613	117230	56.49
1905	2613	119843	57.79
1956	2604	122447	59.09

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS — BASE CASE CAT1
TOTAL CANADIAN OUTPUT FOR ST LAWRENCE, ST MARYS AND NIAGARA RIVER PLANTS — 1900-1976

DURATION LISTING FOR DAYTIME ENERGY(AV. MW) FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE		
1957	2599	125046	60.39		
1926	2595	127642	61.69		
1929	2592	130234	62.99		
1924	2591	132825	64.29		
1902	2588	135413	65.58		
1910	2588	138001	66.88		
1967	2582	140583	68.18		
1945	2580	143163	69.48		
1933	2579	145742	70.78		
1918	2577	148319	72.08		
1937	2576	150895	73.38		
1928	2573	153468	74.68		
1906	2546	156014	75.97		
1911	2546	158560	77.27		
1941	2540	161100	78.57		
1929	2534	163634	79.87		
1908	2530	166164	81.17		
1914	2520	168684	82.47		
1955	2492	171176	83.77		
1937	2490	173666	85.06		
1938	2486	176152	86.36		
1940	2474	178626	87.66		
1942	2467	181093	88.96		
1959	2458	183551	90.26		
1963	2452	186003	91.56		
1934	2438	188441	92.86		
1926	2373	190814	94.16		
1935	2358	193172	95.45		
1936	2331	195503	96.75		
1964	2321	197824	98.05		
1965	2273	200097	99.35	AVERAGE VALUE	2599

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS — BASE CASE CAT1
TOTAL CAPACITY OUTPUT FOR ST LAWRENCE, ST MARYS AND NIAGARA RIVER PLANTS — 1900-1976

DURATION LISTING FOR PEAK OUTPUT (MEGAWATTS) FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE
1973	3017	3017	.65
1974	3015	6032	1.95
1976	2995	9027	3.25
1976	2992	12020	4.55
1975	2985	14797	5.64
1971	2974	17971	7.14
1969	2982	20953	8.44
1972	2975	23928	9.74
1965	2963	26891	11.04
1901	2961	29854	12.34
1951	2961	32813	13.64
1952	2961	35774	14.94
1967	2959	38733	16.23
1912	2958	41691	17.53
1921	2958	44649	18.83
1918	2957	47606	20.13
1929	2957	50563	21.43
1930	2957	53520	22.73
1963	2957	56477	24.03
1966	2957	59434	25.32
1972	2957	62391	26.62
1913	2955	65346	27.92
1926	2954	68300	29.22
1919	2954	71254	30.52
1955	2954	74208	31.82
1924	2952	77160	33.12
1961	2952	80112	34.42
1970	2951	83063	35.71
1916	2950	86013	37.01
1927	2949	88962	38.31
1933	2949	91911	39.61
1974	2948	94859	40.91
1947	2947	97806	42.21
1936	2945	100751	43.51
1953	2943	103694	44.81
1911	2940	106634	46.10
1950	2939	109573	47.40
1967	2936	112509	48.70
1946	2934	115443	50.00
1949	2934	118377	51.30
1958	2932	121309	52.60
1914	2931	124240	53.90
1900	2928	127168	55.19
1954	2928	130096	56.49
1917	2926	133022	57.79
1910	2925	135947	59.09

-402-

EVALUATION OF REGULATIONS FOR GREAT LAKES LEVELS AND OUTFLOWS — BASE CASE CAT1
TOTAL CANADIAN OUTPUT FOR ST LAWRENCE, ST MARYS AND NIAGARA RIVER PLANTS — 1900-1976

DURATION LISTING FOR PEAK OUTPUT (MEGAWATTS) FOR JANUARY

YEAR	VALUE	ACCUMULATED VALUE	PERCENTAGE	
1956	2925	139872	60.39	
1922	2924	141796	61.69	
1945	2924	144720	62.99	
1954	2924	147644	64.29	
1957	2923	150567	65.58	
1905	2920	153487	66.88	
1915	2920	156407	68.18	
1944	2920	159327	69.48	
1966	2920	162247	70.78	
1971	2918	165165	72.08	
1906	2917	168082	73.38	
1909	2915	170997	74.68	
1920	2914	173911	75.97	
1911	2912	176823	77.27	
1939	2912	179735	78.57	
1923	2910	182645	79.87	
1941	2905	185550	81.17	
1942	2896	188446	82.47	
1936	2881	191327	83.77	
1977	2879	194206	85.06	
1925	2875	197081	86.36	
1940	2870	199951	87.66	
1962	2869	202820	88.96	
1959	2864	205684	90.26	
1963	2852	208536	91.56	
1934	2850	211386	92.86	
1928	2796	214182	94.16	
1935	2785	216967	95.45	
1938	2759	219726	96.75	
1964	2751	222477	98.05	
1965	2700	225177	99.35	AVERAGE VALUE 2924

ANNEX D - COMPUTER PROGRAMS

PART 2 - QUEBEC SYSTEM

TABLE OF CONTENTS

ST. LAWRENCE RIVER REGULATION STUDIES

	Page
SECTION 1	1.
. General description	1.
. Data file	1.
. Subroutines	1.
SECTION 2	3.
. Input data definition	3.
SECTION 3	8.
. Program listing	8.
. Subroutines listing	12.
SECTION 4	24.
. Output listing	24.

ST LAWRENCE RIVER REGULATION STUDIES

SECTION 1

General description

This program is used to calculate the power output at Beauharnois and Cedars generating station according to the inflow from Lake Ontario of differents plans.

The program is written in Fortran IV language and it is executed on a IBM/370 computer.

By comparaison with the base case, the program calculate the gains or the losses in kilowatts and dollars for eaxh plan.

Data file

The program use a temporary file on magnetic disk which is defined as follow: (170, 80, V.NR). The JCL associated to this file is: DSN = FILE NAME, DISP = (NEW, DELETE), SPACE = (TRK, (5,2)), DCB = (LRECL = 320, BLK SIZE = 1600, RECFM = FB), UNIT = TRAVAIL.

Subroutines

The main program use 5 subroutines and 3 function sudroutines which are listed in section 3. A deck of cards of every subroutines is supply with the main program.

The subroutines are written in Fortran IV Language and the function subroutines are written in Assembler Language.

- Subroutine HSCSU1 compute a function Y = F (X,Z)
- Subroutine RR100 compares output energy of Beauharnois G.S. and Cedars G.S. between the base case and other plans.
- Subroutine CADRE is used by the main program to centerize titles in an output vector
- Subroutine ANOMO return the number of days of a specify month.
- Function subroutines ISLA and ISRA are called by subroutine ANOMO and shift characters right or left.
- Function subroutine ICOMPL compares characters and it is called by subroutine CADRE.

ST LAWRENCE RIVER REGULATION STUDIES

SECTION 2

Input date definition

Card #1 (KAN, TIT)

KAN = Number of years simulated, in column 1 and 2

TIT = General title in column 3 to 80

Card #2 to 6 (C)

C = Regression coefficients to calculate head race elevation and energy output at Beauharnois G.S. and, energy output at Cedars G.S. Format: 5E15.7

Card #7 to 10 (XM1, XM2, XM3)

Maximum and minimum values associated to the regression coefficent C. Format: 4E15.7

Card #11 and 12 (CHE)

CHE = Non-power flow requirements at Beauharnois G.S. and Cedars G.S. Format: 12F6.0

Card #13 and 14 (QMX)

QMX = Maximum permissible discharge at Beauharnois G.S. in thousands of cfs. Format: 12F6.0

Card #15 and 16 (QMX)

QMX = Maximum permissible discharge at Cedars G.S. in thousands of cfs. Format 12F6.0

Card #17 and the following (STF)

STF = Monthly mean local inflow of Lake St-Francis

Each card contends 12 monthly value. Format: 12F6.0

The number of these cards depends on the number of years (KAN) to study. A listing of values from 1900 to 1978 is included at the end of this section.

Card #18 (KAS, IMP, PRIX)

KAS = Number of plan to be study with a maximum of 8 plans, in column 2.

IMP = This is a control parameter which allow the detail output to be printed or not (column 4)

if IMP = 1 the detail is printed

if IMP = 0 no detail output is printed

PRIX= Price associated to energy in dollars per mills. 5 different prices can be ask. Format 5F4.0 Column 5 to 24.

Card #19 and following (KTIT, COR)

KTIT= Title of the plan basis of comparaison, column 1 to 20.

COR = Monthly mean flow from Cornwall in thousands of cfs, column 5 to 40, (12 values) and on the same card the monthly mean outflow of Lake St-Louis in thousand of cfs, column 45 to 80 (12 values)

The column 1 to 4 contains the year which is overpass at reading time.

The number of cards depends on the number of years to be study.

The next decks of cards are all the other plans to be compare with the first plan (basis of comparaison) with the same format. (card #19)

The number of cases, including the base case, is defined by the variable KAS on card #18.

LAKE ST.FRANCIS MONTHLY MEAN LOCAL INFLOW IN CFS

4147.	6048.	13527.	10058.	4543.	2040.	1407.	1335.	1217.	1747.	4782.	3387.	1900
1789.	1446.	12813.	17663.	5465.	2414.	1309.	1381.	1424.	2638.	2473.	3728.	1901
2848.	1974.	21143.	12959.	6190.	2696.	1828.	1209.	1132.	1659.	2763.	2992.	1902
2414.	4432.	19156.	9859.	787.	1253.	958.	900.	676.	1045.	659.	523.	1903
981.	1642.	11724.	16601.	7910.	2937.	1636.	1244.	1730.	3485.	2265.	928.	1904
1258.	1498.	9222.	14965.	3726.	1762.	1075.	915.	952.	1741.	2556.	2403.	1905
2886.	2299.	8922.	14699.	3648.	1951.	1397.	771.	801.	1719.	1237.	2238.	1906
2719.	1947.	10545.	15996.	3768.	1955.	1199.	784.	912.	1924.	3263.	3814.	1907
2386.	4609.	17779.	10476.	8095.	2615.	1283.	1045.	801.	467.	296.	101.	1908
3914.	4816.	15078.	11783.	8696.	2857.	1477.	965.	1175.	1379.	2745.	1568.	1909
2324.	3249.	10045.	14994.	6148.	2491.	1456.	1280.	1315.	2813.	2737.	929.	1910
1282.	1578.	5492.	15527.	3443.	1779.	1208.	949.	1159.	1738.	2593.	3873.	1911
1934.	1850.	5169.	18341.	9384.	3156.	1614.	1057.	1527.	3212.	5268.	4809.	1912
5811.	3726.	20803.	11544.	6008.	2241.	1119.	832.	1033.	2922.	3900.	2533.	1913
2834.	1754.	5120.	16399.	2474.	1472.	837.	894.	954.	1191.	2064.	1562.	1914
3706.	5193.	11267.	11575.	3602.	1692.	920.	677.	710.	589.	1051.	1864.	1915
4284.	3453.	6961.	14205.	6900.	2549.	1574.	815.	927.	2051.	3192.	2806.	1916
3076.	2134.	7594.	16498.	5494.	2450.	1642.	1540.	1253.	2993.	2531.	1212.	1917
1070.	3353.	8268.	14279.	4946.	2200.	1401.	900.	1522.	4415.	7483.	6238.	1918
3452.	1885.	10480.	16789.	6768.	2751.	1669.	900.	1012.	2736.	3694.	1681.	1919
918.	1278.	8627.	19470.	3454.	1996.	1017.	987.	1184.	2158.	2242.	5378.	1920
2749.	1931.	13560.	14187.	1422.	1206.	635.	827.	1014.	2472.	2449.	1881.	1921
1060.	1320.	26997.	16413.	3547.	11774.	4152.	8026.	3669.	3311.	4136.	3798.	1922
2188.	640.	3252.	25752.	10450.	5445.	1202.	844.	758.	872.	2353.	6246.	1923
2730.	1897.	4242.	19564.	7817.	1182.	880.	1575.	1378.	4635.	2856.	3857.	1924
950.	5028.	18582.	6678.	2989.	1646.	1410.	1952.	4085.	5971.	5932.	4517.	1925
2655.	1473.	1767.	22903.	6521.	4557.	4360.	3492.	2274.	5500.	6796.	2141.	1926
1488.	2141.	11078.	2930.	3767.	1551.	1928.	1481.	1025.	1280.	16500.	15635.	1927
5460.	2620.	6050.	18189.	5657.	2667.	1862.	2317.	1653.	4910.	6010.	2930.	1928
1634.	1217.	14771.	17010.	10096.	2019.	1414.	691.	467.	1005.	1677.	565.	1929
8800.	5146.	6757.	15871.	5500.	4635.	1724.	1052.	695.	663.	750.	675.	1930
538.	671.	3732.	8092.	2836.	1547.	938.	597.	1100.	1194.	3449.	3630.	1931
7582.	3347.	1202.	26203.	4085.	2011.	1437.	1445.	887.	1657.	3178.	3099.	1932
3637.	2341.	2482.	27775.	6953.	1567.	546.	420.	522.	687.	911.	864.	1933
1728.	986.	5696.	27500.	2663.	1245.	1131.	381.	365.	561.	911.	628.	1934
3897.	1402.	11864.	12375.	6050.	3001.	1441.	1728.	1414.	1162.	1921.	1402.	1935
770.	891.	24278.	10332.	5775.	1638.	1312.	805.	487.	1901.	6061.	3280.	193[illegible]
6089.	3276.	1591.	16060.	10489.	3527.	1158.	2090.	1241.	1339.	2714.	1430.	1937
1838.	3421.	17207.	9428.	4203.	1257.	821.	612.	1013.	860.	982.	2007.	1938
1500.	1056.	3205.	29232.	4973.	2423.	1162.	762.	640.	860.	1634.	2239.	1939
868.	632.	1001.	21886.	4093.	3001.	2530.	1033.	785.	821.	1897.	4875.	1940
3394.	2066.	2321.	15470.	1555.	1033.	498.	424.	416.	546.	1072.	1021.	1941
1272.	954.	17663.	17069.	1932.	1241.	447.	514.	483.	711.	1139.	891.	1942
1426.	6273.	16814.	8949.	12893.	3315.	2247.	1433.	950.	1650.	4533.	2451.	1943
1701.	1815.	15353.	13781.	4478.	1650.	852.	518.	589.	978.	1622.	1127.	1944
1496.	1638.	23453.	11314.	14850.	3138.	1426.	561.	950.	5429.	5798.	1873.	1945
4466.	2349.	13310.	4879.	5951.	1225.	459.	459.	322.	2730.	6014.	4922.	1946
3508.	4219.	7024.	17615.	15769.	13192.	7920.	1512.	2533.	1323.	3135.	4140.	1947
1245.	2412.	11962.	6057.	5095.	1237.	734.	671.	267.	475.	1595.	1496.	1948
7472.	5299.	11424.	10143.	2561.	1103.	644.	385.	1056.	1261.	2647.	4675.	1949
6914.	1433.	5892.	17050.	2412.	1249.	624.	832.	1166.	970.	5382.	5303.	1950

LAKE ST.FRANCIS MONTHLY MEAN LOCAL INFLOW IN CFS

7700.	4046.	18385.	15989.	2632.	2773.	4085.	1473.	1064.	887.	2840.	1779.	1951
4478.	4439.	12610.	14182.	3850.	2435.	2742.	821.	785.	3225.	2427.	5853.	1952
4635.	5264.	11471.	12767.	8328.	1744.	1343.	848.	671.	1331.	1186.	2223.	1953
1343.	6442.	19210.	20153.	8800.	4989.	1932.	1261.	4596.	9507.	9467.	7307.	1954
3476.	2050.	17089.	25103.	2266.	1426.	632.	1025.	1213.	1202.	1213.	660.	1955
1135.	974.	2145.	20625.	9192.	2757.	931.	561.	766.	703.	809.	2050.	1956
2074.	2671.	8407.	4635.	3795.	1991.	1300.	773.	762.	758.	1284.	4714.	1957
1854.	1712.	5067.	26478.	3889.	2113.	1151.	990.	1143.	3865.	3547.	1885.	1958
2557.	2247.	8800.	20978.	1948.	2561.	919.	656.	683.	1225.	3017.	7346.	1959
1803.	4753.	2808.	33118.	3413.	1532.	498.	420.	612.	1052.	1555.	718.	1960
573.	1665.	10528.	15753.	4635.	2856.	2062.	1155.	883.	758.	1060.	3543.	1961
2097.	1347.	9114.	18189.	4792.	986.	856.	4557.	1331.	4203.	8800.	3720.	1962
1414.	1414.	8289.	22825.	6757.	1265.	750.	1799.	2435.	1151.	6678.	4046.	1963
5264.	2023.	11825.	8957.	2950.	1166.	628.	711.	648.	660.	1453.	1665.	1964
1669.	2628.	2475.	5539.	1893.	644.	534.	1606.	1987.	3535.	9114.	6325.	1965
2871.	3465.	10725.	6285.	3303.	1567.	679.	726.	840.	856.	1316.	2054.	1966
2021.	1901.	5872.	18776.	4434.	2085.	1773.	1394.	1334.	3088.	5153.	6392.	1967
2381.	3333.	14340.	6960.	3211.	1174.	2353.	1216.	1094.	1496.	6289.	5702.	1968
4074.	5592.	9227.	23008.	5432.	4314.	1793.	1146.	1082.	1681.	5632.	2556.	1969
1378.	2572.	9387.	25566.	5233.	1693.	2093.	1158.	1893.	2796.	3547.	2516.	1970
2463.	2286.	4871.	32135.	9939.	1606.	940.	1096.	1602.	935.	1060.	4007.	1971
3406.	2003.	3626.	31468.	9939.	7150.	6521.	7071.	1378.	2824.	9075.	5735.	1972
10546.	6751.	23083.	12423.	8229.	8948.	1953.	1941.	1861.	2676.	3890.	6990.	1973
9800.	6990.	11270.	17210.	11070.	4100.	2480.	2980.	3050.	3620.	13400.	11170.	1974
10810.	7225.	10680.	14280.	4250.	1130.	3680.	2740.	5210.	9730.	12670.	12240.	1975
6200.	12840.	19310.	13210.	11460.	2850.	5520.	9910.	10770.	9920.	9240.	5150.	1976
4620.	6940.	19770.	17460.	13710.	13090.	13280.	14300.	12010.	14280.	14500.	12080.	1977
10330.	8040.	6170.	28430.	10550.	8460.	8260.	8100.	9810.	11220.	12180.	8340.	1978

```
G1  RELEASE 2.0                MAIN                DATE = 80136          11/48/00

      C     PLAN DE REGULATION DU SAINT-LAURENT
      C     ************************************************************************
      C     *       DISPOSITION DES CARTES                                         *
      C     * 1) NOMBRE D'ANNEES, LE TITRE ( 1 CARTE )                             *
      C     * 2) COEFFICIENTS DES EQUATIONS DE SURFACE ( 4 CARTES )                 *
      C     * 3) LES MAX. ET MIN. POUR CHAQUES EQUATIONS ( 3 CARTES )               *
      C     * 4) DEBITS DES CHENEAUX ( 1 CARTE )                                   *
      C     * 5) DEBIT MAX. TURBINABLE A BEAUHARNOIS ( 1 CARTE )                   *
      C     * 6) DEBIT MAX. TURBINABLE AUX CEDRES ( 1 CARTE )                      *
      C     * 7) APPORTS NATURELS DU LAC ST-FRANCOIS ( 68 CARTES )                 *
      C     * 8) CARTE DE CONTROLE (1)  A) NOMBRE DE CAS ETUDIE (I2) MAX= 8        *
      C     *                           B) IMPRESSION DU DETAIL, SI OUI= (I2)      *
      C     *                           C) LE PRIX DU MILLS/KWH (5F4.0)            *
      C     * 9) DEBIT DE SORTIE DE CORNWALL  A) PLAN DE BASE ( 68 CARTES )        *
      C     *                                 B) LES AUTRES PLANS                  *
      C     ************************************************************************
            INTEGER*2 TIT(23),KTIT(10,8)
            DIMENSION          C(18),XM1(4),XM2(4),XM3(4),        CHE(12),QMX(12
           *),Q1MX(12),BC(13,8),COR(24),STF(12),ITABL(5),
           * PRIX(5),AMY(8),PRX(5,12,8),AMP(5,8),BCK(12,8)
            DIMENSION TT(13,13)
            DEFINE FILE 1(170,80,U,MR)
          1 FORMAT(5E15.7)
          2 FORMAT(12F6.0)
          3 FORMAT(4E15.7)
          4 FORMAT(I2,38A2)
          5 FORMAT(10A2)
          6 FORMAT(1H0,36X,33A2//  10X, '*',6X,'APPORTS',6X,'*','  PERTES *',
           1 14X, 'BEAUHARNOIS',14X, '*', 12X, 'LES CEDRES', 13X,'*',5X,'TOTAL
           2'/ '   AN MOIS  CORNWALL  ST-FRANC.  CHENEAUX   AMONT  AVAL  CHUTE
           3   TURBINE  ENERGIE   TURBINE  DEVERSE  CHUTE  ENERGIE    ENERGIE'
           4 /)
          7 FORMAT(I5,I5,F10.0,F11.0,F10.0,F8.2,F6.2,F7.2,F10.0,F9.0,F10.0,
           1F9.0,F8.2,F9.0,F11.0)
          8 FORMAT(1H0, 14X, 5A2, F12.0,5F15.0)
          9 FORMAT(1H0,/33X,10A2//27X,  'BEAUHARNOIS + LES CEDRES'     // 30X,
           $ 'MOYENNE DE', I3, ' ANS'// , 32X, 'K W',2X,5(4X,F5.2, ' MILLS'))
         10 FORMAT(4X,12F3.0,4X,12F3.0)
         11 FORMAT(2I2, 5F4.0)
         12 FORMAT(1H0, 16X, 'ANNUEL', F14.0, 5F15.0)
         13 FORMAT(1H )
         14 FORMAT(1H1)
         15 FORMAT(1H1////16X, 'LISTE DES VALEURS MENSUELLES FIXEES DANS LA SI
           IMULATION' /// 22X, 'MOIS', 5X, 'DEBIT  NON   DEBIT MAXIMAL TURBINA
           2BLE'/ 31X, 'PRODUCTIF', 4X, 'BEAUHARNOIS  LES CEDRES'/  34X, 'PCS'
           3, 11X, 'PCS', 10X, 'PCS'/)
         16 FORMAT(1H0, 19X,5A2, F8.0,8X, F7.0, 7X, F6.0)
         17 FORMAT(1H0/ 10X, 'MOYENNE MENSUELLE ET ANNUELLE DES', I3,' ANNEES
           $ETUDIEES')
            IN=5
            IOUT=6
            QCMIN=10000.
            IANDB=1899
            READ(IN,4) KAN,TIT
            READ(IN,5)
            READ(IN,1) C
            READ(IN,5)
            READ(IN,3) XM1,XM2,XM3
```

```
      READ(IN,5)
      READ(IN,2)CHE
      READ(IN,5)
      READ(IN,2) QMX
      READ(IN,5)
      READ(IN,2) Q1MX
      WRITE(IOUT,15)
      DO 30 I=1,12
      CALL ANOMO(I,2,ITABL)
   30 WRITE(IOUT,16) (ITABL(J),J=1,5), CHE(I),QMX(I),Q1MX(I)
      READ(IN,5)
      DO 60 J=1,KAN
      READ(IN,2) STF
   60 WRITE(1'2*J) STF
      READ(IN,11) KAS,IMP,PRIX
      DO 200 KS=1,KAS
      DO 40 I=1,12
      BCK(I,KS)=0.
   40 BC(I,KS)=0.
      READ(IN,5)(KTIT(L,KS),L=1,10)
      DO 50 J=1,KAN
      READ(IN,10) COR
   50 WRITE(1'2*J-1) COR
      K=50
      MR=1
      DO 51 I=1,13
      DO 51 J=1,13
   51 TT(I,J)=0.
      DO 150 J=1,KAN
      READ(1'MR) COR
      READ(1'MR) STF
      DO 70 I=1,12
      COR(I)= COR(I)*1000.
      AI=I
      BEA= COR(I)+STF(I)-CHE(I)-QCMIN
      IF(BEA-QMX(I)) 80,80,90
   90 QB= QMX(I)
      QC= BEA-QMX(I)+QCMIN
      IF(QC-Q1MX(I)) 95,95,100
  100 DEV= QC-Q1MX(I)
      QC= Q1MX(I)
      GO TO 110
   80 QB= BEA
      QC=QCMIN
   95 DEV=0.
C     PASSE 260,000 PCS, LE NIVEAU AMONT RESTE CONSTANT
  110 SAVQB=QB/1000.
      IF(SAVQB-260.) 96,96,97
   97 SAVQB=260.
   96 CALL HSCSU1(SAVQB,AI,AMT,1,2,C,1,XM1)
      IF(I-11) 112,112,113
  112 IF(I-3) 113,113,114
C
C  BEAUHARNOIS AVAL EN HIVER ( DE DEC. A MARS INCL. )
C
  113 AVL= 61.5935+.030791*COR(I+12)
C
      GO TO 115
```

```
G1  RELEASE 2.0                MAIN                DATE = 80136          11/48/00

      C
      C  BEAUHARNOIS AVAL EN ETE
      C
        114 AVL= 62.5621+.0253227*COR(I+12)
      C
        115 BCHUT= AMT-AVL
            CALL HSCSU1( QB/1000.,BCHUT,BMWH,1,2,C,7,XM2)
            BMWH=BMWH/7.
      C     PRODUCTION MAX. A B'H'NOIS = 37776 MW.H/JR
            IF(BMWH-37776) 1116,1116,1117
       1117 BMWH=37776
      C     REDEFINIR LE DEBIT MAX. A B'H'NOIS EN FONCTION DE BCHUT
            QQ= (457.85 - 2.15*BCHUT) * 1000.
            QR=QMX(I)-QQ
            QC= QC+QR
            IF(QC-Q1MX(I) ) 1116,1116,1119
       1119 DEV= QC-Q1MX(I)
            QC= Q1MX(I)
       1116 CONTINUE
            IF(I-5) 116,117,117
        117 IF(I-11) 118,116,116
      C
      C  LES CEDRES CHUTE EN ETE ( DE MAI A OCT. INCL. )
      C
        118 CCHUT= 39.
            GO TO 119
      C
      C  LES CEDRES EN HIVER
      C
        116 CCHUT= (-29.38943 - .01739744*((QC+DEV)-82400.)+3350.)/100.
        119 CONTINUE
            CALL HSCSU1(QC,CCHUT,CMWH,1,2,C,13,XM3)
            CALL NJOUR(J+3,I,NJM)
            BMWH=BMWH*NJM
            CMWH= CMWH*NJM
            BCMWH= BMWH+CMWH
            BCK(I,KS)= BCK(I,KS)+BCMWH
            BC(I,KS)= BC(I,KS)+BCMWH/(24.*NJM/1000.)
            IF(IMP)126,126,124
        124 K=K+1
            IF(K-48) 120,120,125
        125 K=1
            WRITE(IOUT,14)
            WRITE(IOUT,6) TIT,(KTIT(L,KS),L=1,10)
        120 IAN= IANDB+J
            WRITE(IOUT,7) IAN,I,COR(I),STF(I),CHE(I),AMT,AVL,BCHUT,QB,BMWH,QC,
           1 DEV,CCHUT,CMWH,BCMWH
        126 TT(1,I)= TT(1,I)+COR(I)
            TT(2,I)= TT(2,I)+STF(I)
            TT(3,I)= TT(3,I)+CHE(I)
            TT(4,I)= TT(4,I)+AMT
            TT(5,I)= TT(5,I)+AVL
            TT(6,I)= TT(6,I)+BCHUT
            TT(7,I)= TT(7,I)+QB
            TT(8,I)= TT(8,I)+BMWH
            TT(9,I)= TT(9,I)+QC
            TT(10,I)= TT(10,I)+DEV
            TT(11,I)= TT(11,I)+CCHUT
```

```
            TT(12,I)= TT(12,I)+CMWH
            TT(13,I)= TT(13,I)+BCMWH
         70 CONTINUE
            IF(IMP) 150,150,140
        140 WRITE(IOUT,13)
        150 CONTINUE
            WRITE(IOUT,14)
            WRITE(IOUT,6) TIT,(KTIT(L,KS),L=1,10)
            AKAN=KAN
            KDUM=100000
            DO 151 J=1,12
            DO 152 I=1,13
            TT(I,J)= TT(I,J)/AKAN
        152 TT(I,13)= TT(I,13)+TT(I,J)
        151 WRITE(IOUT,7)KDUM,J,(TT(I,J),I=1,13)
            DO 154 I=1,13
        154 TT(I,13)=TT(I,13)/12.
            WRITE(IOUT,13)
            WRITE(IOUT,7) KDUM,KDUM,(TT(I,13),I=1,13)
            WRITE(IOUT,17) KAN
        200 CONTINUE
            WRITE(IOUT,14)
            DO 170 KS=1,KAS
            AMY(KS)=0.
            DO 160 I=1,12
            BC(I,KS)= BC(I,KS)/KAN
            BCK(I,KS)= BCK(I,KS)/KAN
            AMY(KS)= AMY(KS)+BC(I,KS)
            LL=0
            DO 180 L=1,5
            IF(PRIX(L)-.1) 180,180,190
        190 PRX(L,I,KS)= BCK(I,KS)*PRIX(L)+.005
            LL=LL+1
        180 CONTINUE
        160 CONTINUE
            AMY(KS)= AMY(KS)/12.
        170 CONTINUE
            NN= KAN/4
            HEURE= ((NN*366. + (KAN-NN)*365.) / (KAN*12.)) * 24.
            DO 210 KS=1,KAS
            DO 210 L=1,LL
        210 AMP(L,KS)=AMY(KS)/1000.*HEURE*PRIX(L)+.005
            DO 230 KS=1,KAS
            WRITE(IOUT,9) (KTIT(L,KS),L=1,10),KAN,(PRIX(I),I=1,LL)
            WRITE(IOUT,13)
            DO 220 L=1,12
            CALL ANOMO (L,2,ITABL)
        220 WRITE(IOUT,8) ITABL,BC(L,KS),(PRX(I,L,KS),I=1,LL)
            WRITE(IOUT,12) AMY(KS),(AMP(L,KS),L=1,LL)
            BC(13,KS) = AMY(KS)
        230 WRITE(IOUT,14)
            IF(KAS-1) 250,250,240
      C
      COMPARAISON AVEC LE PLAN DE BASE
      C
        240 CALL RR100(KAS,KTIT,BC,PRIX,LL)
        250 STOP
            END
```

1 RELEASE 2.0 MAIN DATE = 80134 10/08/34

```
C     ********************************************************************
C     *  APPLICATION DE LA FONCTION Y=F(X,Z)                             *
C     ********************************************************************
C     *  DEFINITION DES PARAMETRES                                       *
C     *  X = VALEUR OU VECTEUR DE X  (MW)                                *
C     *  Z = VALEUR OU VECTEUR DE Z  (H)                                 *
C     *  Y = VALEUR OU VECTEUR DE Y RETOURNE  (Q)                        *
C     *  NP = NOMBRE DE VALEUR Y A CALCULER                              *
C     *  IP = LE DEGRE DE L'EQUATION                                     *
C     *  C = VECTEUR CONTENANT LES COEFFICIENTS                          *
C     *  N1 = INDICE DU PREMIER COEFFICIENT                              *
C     *  XM = BANDE DE VARIATION DE X ET Z                               *
C     ********************************************************************
      SUBROUTINE HSCSU1(X,Z,Y,NP,IP,C,N1,XM)
      DIMENSION X(1),Y(1),Z(1),C(1),Q(8)
      DIMENSION XM(4)
      IF(N1) 300,300,10
   10 IF(IP-7) 20,20,300
   20 DO 200 I=1,NP
      A=(X(I)-XM(2))/(XM(1)-XM(2))*100.
      B=(Z(I)-XM(4))/(XM(3)-XM(4))*100.
      N=N1
      Y(I)=C(N)
      K=1
      Q(1)=1.0
      QA=1.0
  100 J=1
  105 IF(J-K) 110,110,120
  110 Q(J)=Q(J)*A
      GO TO 130
  120 Q(J)=QA*B
      QA=Q(J)
  130 N=N+1
      Y(I)= Y(I)+C(N)*Q(J)
      IF(J-K) 140,140,150
  140 J=J+1
      GO TO 105
  150 K=K+1
      IF(K-IP) 100,100,200
  200 CONTINUE
  300 RETURN
      END
```

1 RELEASE 2.0 MAIN DATE = 80136 11/48/00

```
C     ********************************************************************
C     *  COMPARAISON DES PLANS AVEC LE PLAN DE BASE                      *
C     ********************************************************************
      SUBROUTINE RR100(KAS,IA,A,PRIX,LL)
      DIMENSION A(13,8),ITAB(5),PRIX(5)
      INTEGER*2 IA(10,8),IB(10)
    2 FORMAT(1H0//// 32X,10A2 // 30X, 'BEAUHARNOIS + LES CEDRES'//
     1 28X, 'PUISSANCE MOYENNE EN KILOWATT')
    3 FORMAT(1H0,/22X, 20A2,     'DIFFERENCE' /)
    4 FORMAT(1H0, 9X, 5A2, F16.0,F20.0,F14.0)
    5 FORMAT(1H0,/10X, 'MOYENNE',3X, F16.0,F20.0,F14.0//)
    6 FORMAT(1H0, 17X,F10.0, ' KW @ $',F5.2,' LE MW.H = $', F9.0,'/AN')
    7 FORMAT(1H1)
      IN=5
      IOUT=6
      DO 20 I=1,KAS
      DO 30 J=1,10
   30 IB(J)= IA(J,I)
      CALL CADRE(IB,20,2)
      DO 40 J=1,10
   40 IA(J,I)=IB(J)
   20 CONTINUE
      WRITE(IOUT,7)
      DO 50 I=2,KAS
      WRITE(IOUT,2) (IA(J,I),J=1,10)
      WRITE(IOUT,3) (IA(J,1),J=1,10),(IA(J,I),J=1,10)
      DO 60 J=1,12
      CALL ANOMO(J,2,ITAB)
      D= A(J,I)-A(J,1)
   60 WRITE(IOUT,4) ITAB, A(J,1),A(J,I),D
      D= A(13,I) -A(13,1)
      WRITE(IOUT,5) A(13,1),A(13,I),D
      DO 65 J=1,LL
      P= D*8760.*PRIX(J)/1000.
      WRITE(IOUT,6) D,PRIX(J),P
   65 CONTINUE
      WRITE(IOUT,7)
   50 CONTINUE
      RETURN
      END
```

```
(V G1  RELEASE 2.0              MAIN              DATE = 80137          10/43/38

      C     SOUS-PROGRAMME CADRE
      C
      C     ************************************************************************
      C     *                                                                      *
      C     *   BUT. CADRER UN VECTEUR ALPHANUMERIQUE SOIT, A GAUCHE,              *
      C     *        AU CENTRE OU A DROITE.                                        *
      C     *                                                                      *
      C     *   DEFINITION DES VARIABLES                                           *
      C     *                                                                      *
      C     *   NOM(NBYTE)    = VECTEUR A CADRER 'TYPE=LOGICAL'                    *
      C     *   LONG          = NOMBRE D'OCTETS DANS LE VECTEUR                    *
      C     *   KADRE         = CODE DE CADRAGE                                    *
      C     *                   1- A GAUCHE                                        *
      C     *                   2- AU CENTRE                                       *
      C     *                   3- A DROITE                                        *
      C     *                                                                      *
      C     ************************************************************************
      C
            SUBROUTINE CADRE(NOM,LONG,KADRE)
      C
            INTEGER*4 MDBFN(3),BLANC/'    '/
      C
            LOGICAL*1 NOM(1),BLC/' '/
      C
            EQUIVALENCE (MDBFN(1),IFN),(MDBFN(2),NFIN),(MDBFN(3),IDB)
      C
      C     ************************************************************************
      C     *                                                                      *
      C     *   LOCALISATION DE L'INFORMATION ENTRE 'IDB' ET 'IFN'                 *
      C     *                                                                      *
      C     ************************************************************************
      C
            KGCD=KADRE
            NBYTE=LONG
        100 IDB = 1
            IFN = 0
        110 IF(ICOMPL(NOM(IDB),BLANC,1).EQ.0) GO TO 130
            N=4
        115 IF(IFN+N.LE.NBYTE) GO TO 125
        120 N=N-1
            IF(N.EQ.0) GO TO 150
            GO TO 115
        125 IF(ICOMPL(NOM(IFN+1),BLANC,N).EQ.0) GO TO 210
            GO TO 140
        130 IDB = IDB + 1
        140 IFN = IFN + 1
            IF(IFN.LT.NBYTE) GO TO 110
        150 IF(IDB.GT.IFN) GO TO 390
      C
      C     ************************************************************************
      C     *                                                                      *
      C     *   CALCUL DU DEPLACEMENT DE L'INFORMATION PAR RAPPORT                 *
      C     *          AU SENS DU CADRAGE                                          *
      C     *                                                                      *
      C     ************************************************************************
      C
        210 KDEPL = IDB - 1
            IF ( KGCD - 2 ) 240,230,220
```

```
      220 KDEPL = IFN - NBYTE
          GO TO 250
      230 KDEPL = IDB + ( IFN - IDB ) / 2 - ( NBYTE + 1 ) / 2
      240 LOOP = 1
          NFIN = IFN
      250 IF ( KDEPL ) 260,390,270
      260 LOOP = -1
          NFIN = IDB
      270 IDPL = MDBFN(LOOP+2) - LOOP
          NDPL = IDPL - KDEPL
C
C     ******************************************************************
C     *                                                                *
C     *   DEPLACEMENT DU CHAMP D'INFORMATION                           *
C     *   MISE A BLANC DES CHAMPS LIBERES                              *
C     *   RETOUR AU PROGRAMME APPELANT                                 *
C     *                                                                *
C     ******************************************************************
C
      310 IDPL = IDPL + LOOP
          NDPL = NDPL + LOOP
          NOM(NDPL) = NOM(IDPL)
          IF(IDPL.NE.NFIN) GO TO 310
      320 NDPL = NDPL + LOOP
          NOM(NDPL) = BLC
          IF(NDPL.NE.NFIN) GO TO 320
      390 RETURN
C
C     ******************************************************************
C     *                                                                *
C     *   POINT D'ENTRE DANS CADRE POUR CORER AU CENTRE UNIQUEMENT     *
C     *                                                                *
C     ******************************************************************
C
          ENTRY CENA4(NOM,NMOT)
          KGCD=2
          NBYTE=NMOT*4
          GO TO 100
          END
```

IV G1 RELEASE 2.0 ANOMO DATE = 80137 10/44/03

```
      SUBROUTINE ANOMO (NMO,IFORM,ITABL)
C     ******************************************************************
C     *    NOM DU MOIS EN A1, A2 OU A4                                 *
C     ******************************************************************
C     * PARAMETRES- NMO    = NO DU MOIS (1 A 12)              (ENTREE)*
C     *             IFORM = FORMAT EBCDIC  DE SORTIE DS ITABL  (ENTREE)*
C     *                      1 = A1                                    *
C     *                      2 = A2                                    *
C     *                      4 = A4  (SI DIFFERENT DE 1 ET 2)          *
C     *             ITABL =  VECTEUR 2 MOTS FORMAT A4          (SORTIE)*
C     *                     VECTEUR 4 MOTS FORMAT A2                   *
C     *                     VECTEUR 8 MOTS FORMAT A1                   *
C     *                                                                *
C     ******************************************************************
C     * DEVELOPPEMENT _ LE 20 NOVEMBRE 1973 PAR A.BOURDAGES            *
C     * MODIFICATIONS _                                                *
C     *                                                                *
C     *                                                                *
C     *                                                                *
C     *                                                                *
C     ******************************************************************
C     *     DESCRIPTION DE LA METHODE OU DE LA PROCEDURE               *
C     ******************************************************************
C     *  DEPAQUETAGE  EN A1 OU A2 SELON LE FORMAT REQUIS  DU FORMAT    *
C     * ORIGINAL A4 DU SOUS-PROGRAMME EN UTILISANT ISLA ET ISRA        *
C     ******************************************************************
      DIMENSION NOMMO(36),ITABL(3)
      DATA NOMMO/'JANV','IER ','    ','FEVR','IER ','    ','MARS','    ',
     1','    ','AVRI','L   ','    ','MAI ','    ','    ','JUIN','    ',
     2'    ','JUIL','LET ','    ','AOUT','    ','    ','SEPT','EMBR',
     3'E   ','OCTO','BRE ','    ','NOVE','MBRE','    ','DECE','MBRE',
     4'    '/
      DATA IBL/' '/,IBL1/Z00404040/,IBL2/Z00004040/
C     ******************************************************************
C     *   VERIFICATION ET INITIALISATION                               *
C     ******************************************************************
      IF (NMO.LE.0.OR.NMO.GT.12) GO TO 500
      IDB=(NMO-1)*3+1
C     ******************************************************************
C     *   DETERMINER SI FORMAT A1                                      *
C     ******************************************************************
      IF (IFORM-1)200,100,200
  100 DO 120 LP1=1,3
      DO 110 LP2=1,4
      IF ((LP2+4*(LP1-1))-11)105,600,600
  105 MOT=NOMMO(IDB-1+LP1)
      IBT=24-8*(LP2-1)
      ITABL(LP2+4*(LP1-1))=ISLA(ISRA(MOT,IBT),24)+IBL1
  110 CONTINUE
  120 CONTINUE
C     ******************************************************************
C     *   DETERMINER SI FORMAT A2                                      *
C     ******************************************************************
  200 IF (IFORM-2)400,210,400
  210 DO 230 LP1=1,3
      DO 220 LP2=1,2
      IF ((LP2+2*(LP1-1))-6)215,600,600
  215 MOT=NOMMO(IDB-1+LP1)
```

```
      IBT=16-16*(LP2-1)
      ITABL(LP2+2*(LP1-1))=ISLA(ISRA(MOT,IBT),16)+IBL2
  220 CONTINUE
  230 CONTINUE
C     ********************************************************************
C     *   SI IFORM EST AUTRE QUE 1 OU 2 ON SUPPOSE LE FORMAT A4          *
C     ********************************************************************
  400 ITABL(1)=NOMMO(IDB)
      ITABL(2)=NOMMO(IDB+1)
      ITABL(3)=NOMMO(IDB+2)
      GO TO 600
C     ********************************************************************
C     *   SI NJS EST EN ERREUR LE PREMIER MOT DE ITABL EST MIS A BLANC   *
C     ********************************************************************
  500 ITABL(1)=IBL
  600 RETURN
      END
```

```
V G1  RELEASE 2.0              NJOUR              DATE = 80137          10/44/30

      SUBROUTINE NJOUR(IAN,MOIS,NJM)
C     ******************************************************************
C     *         DETERMINER LE NOMBRE DE JOURS POUR                     *
C     *              UN MOIS ET UNE ANNEE DONNEES                      *
C     ******************************************************************
C     IAN    =  ANNEE OU 'CODE JOUR' SI MOIS EST NEG.          ENTREE
C     MOIS   =  MOIS                                           ENTREE
C     NJM    =  NOMBRE DE JOURS DANS LE MOIS                   SORTIE
C     JOUR   =  NOMBRE DE JOURS DANS CHACUN DES DOUZE MOIS DE L'ANNEE
C     ******************************************************************
C     09/73 : F. DESJARDINS 026  MOD 12/74: A.BOURDAGES
C              ADAPTER AU 9/370
C     ******************************************************************
C     ******************************************************************
      INTEGER*2 JAN, JOUR(12)/31,28,31,30,31,30,31,31,30,31,30,31/
      NJM = 0
      IA1 = IAN
      MOI1= MOIS
      IF(IAN) 100,100,10
   10 IF(IA1) 100,100,20
   20 IF(MOI1 - 12) 30,30,100
   30 IF(MOI1 - 2) 90,40,90
   40 JAN = IA1 / 4
      IF(JAN*4-IA1) 90,50,90
   50 NJM = 29
      GO TO 100
   90 NJM = JOUR(MOI1)
  100 RETURN
      END
```

```
DR2  STMT   SOURCE STATEMENT                                          ASM 0201 10.45

                PRINT   DATA
        ***********************************************************************
        *                                                                     *
        *                S O U S R O U T I N E   I C O M P L                  *
        *                                                                     *
        *   BUT: COMPARE UNE CHAINE DE CARACTERE 'CHAINE1' A PARTIR           *
        *        DU 'IPOS1' IEME CARACTERE AVEC UNE CHAINE 'CHAINE2'          *
        *        A PARTIR DU 'IPOS2' IEME CARACTERE, 'LONG'                   *
        *        CARACTERES A COMPARER.                                       *
        *                                                                     *
        *   APPEL: I = ICOMPL(CHAINE1,CHAINE2,LONG,IPOS1,IPOS2)               *
        *                                                                     *
        *   RESULTAT: I = -1: CHAINE1 < CHAINE2                               *
        *             I = 0 : CHAINE1 = CHAINE2                               *
        *             I = 1 : CHAINE1 > CHAINE2                               *
        *                                                                     *
        *   NOTES: - LONG, IPOS1 ET IPOS2 SONT OPTIONNELS. LES VARIABLES      *
        *            ABSENTES A PARTIR DE LA DROITE ON 1 COMME VALEUR A       *
        *            DEFAUT.                                                  *
        *          - LONG DOIT ETRE > 0 (MAIS PEUT ETRE >256)                 *
        *                                                                     *
        ***********************************************************************
        ***********************************************************************
        *                     DEFINITION DES REGISTRES                        *
        ***********************************************************************
00000   R0        EQU     0       CONTIENDRA LA VALEUR DE LA FONCTION
00001   R1        EQU     1       CONTIENT L'ADRESSE DE LA TABLE DES PARAMS
00002   R2A1      EQU     2       CONTIENDRA ADRESSE DE CHAINE1
00003   R3A2      EQU     3       CONTIENDRA ADRESSE DE CHAINE2
00004   R4        EQU     4       CONTIENDRA POS1, PUIS ADRESSE DE LONG
00005   R5K256    EQU     5       CONTIENDRA LA CONSTANTE 256
00006   R6        EQU     6       CONTIENDRA LONG, PUIS LONG / 256
00007   R7        EQU     7       CONTIENDRA POS2, PUIS LONG MODULO 256
00008   R8K0      EQU     8       CONTIENDRA LA CONSTANTE 0
00009   R9K255    EQU     9       CONTIENDRA LA CONSTANTE 255
00009   R9        EQU     9       TRAVAIL
000C    R12       EQU     12      REGISTRE DE BASE
000E    R14       EQU     14      CONTIENT ADRESSE DE RETOUR DE LA FONCTION
0000F   R15       EQU     15      CONTIENT L'ADRESSE DE LA ROUTINE
        ***********************************************************************
        *                INITIALISER ADRESSIBILITE                            *
        ***********************************************************************
        ICOMPL    CSECT
                  BC      15,12(R15)              DEFINIR LE NOM DE LA ROUTINE
                  DC      X'7'
                  DC      CL7'ICOMPL '
                  SAVE    (2,12)                  CONSERVER LES RESISTRES
                  DS    0H
                  STM   2,12,28(13)                         SAVE REGISTERS
                  BALR    R12,0                   ADRESSIBILITE
0012              USING   *,12
                  SR      R8K0,R8K0               METTRE 0 DANS R8K0
        ***********************************************************************
        *   CHARGER LES ADRESSES DES PARAMETRES                               *
        ***********************************************************************
```

```
DR2  STMT   SOURCE STATEMENT                                          ASM 0201 10.45

                LM      R2A1,R3A2,0(R1)         CHARGER ADR. DE CHAINE1,CHAINE2
                LA      R4,1                    POS1 = 1, PAR DEFAUT
                LA      R6,1                    LONG = 1, PAR DEFAUT
                LA      R7,1                    POS2 = 1, PAR DEFAUT
                TM      4(R1),X'80'             SI CHAINE2 DERNIER PARAMETRE
                BO      CALC                    ALORS ALLER A CALC
                L       R9,8(R1)                CHARGER ADRESSE DE LONG
                C       R8K0,0(R9)              SI LONG <= 0
                BNL     IPOS1                   ALORS ALLER A IPOS1
                L       R6,0(R9)                CHARGER VALEUR DE LONG
        IPOS1   TM      8(R1),X'80'             SI LONG DERNIER PARAMETRE
                BO      CALC                    ALORS ALLER A CALC
                L       R9,12(R1)               CHARGER ADRESSE DE POS1
                C       R8K0,0(R9)              SI IPOS1 <= 0
                BNL     IPOS2                   ALORS ALLER A IPOS2
                L       R4,0(R9)                CHARGER VALEUR DE POS1
        IPOS2   TM      12(R1),X'80'            SI POS1 DERNIER PARAMETRE
                BO      CALC                    ALORS ALLER A CALC
                L       R9,16(R1)               CHARGER ADRESSE DE POS2
                C       R8K0,0(R9)              SI IPOS2 <= 0
                BNL     CALC                    ALORS ALLER A CALC
                L       R7,0(R9)                CHARGER VALEUR DE POS2
        CALC    BCTR    R6,0                    REDUIRE LONG DE 1
                BCTR    R4,0                    REDUIRE POS1 DE 1
                BCTR    R7,0                    REDUIRE POS2 DE 1
                AR      R2A1,R4                 AJOUTER POS1 A CHAINE1
                AR      R3A2,R7                 AJOUTER POS2 A CHAINE2
*************************************************************************
*          CHARGER LES CONSTANTES                                       *
*************************************************************************
                LA      R5K256,256              METTRE 256 DANS R5K256
                LA      R9K255,255              METTRE 255 DANS R9K255
                SR      R7,R7                   METTRE 0 DANS R7
*************************************************************************
*  CALCULER LONG / 256 ET LONG MODULO 256                               *
*************************************************************************
                SRDL    R6,8                    CALCULER LONG/ 256 ET
                SRL     R7,24                   ET LONG MODULO 256
                CR      R6,R8K0                 SI LONG / 256 = 0 ALORS
                BNH     RESTE                   PAS DE MULTIPLES DE 256 BYTES
*************************************************************************
*           COMPARER  LES MULTIPLES DE 256 BYTES                        *
*************************************************************************
        BOUCLER EX      R9K255,COMPARE          DEPLACER 256 BYTES A LA FOIS
                BH      PG                      CHAINE1 > CHAINE2
                BL      PP                      CHAINE1 < CHAINE2
*                                               CHAINE1 = CHAINE2
                AR      R2A1,R5K256             ADDITIONNER 256 AUX ADRESSES
                AR      R3A2,R5K256             DE CHAINE1 ET CHAINE2
                BCT     R6,BOUCLER              BOUCLER POUR TOUS MULTIPLIES
*************************************************************************
*   COMPARER    LES DERNIERS (LONG MODULO 256) BYTES                    *
*************************************************************************
        RESTE   EX      R7,COMPARE              DEPLACER LES (LONG MOD 256)
                BH      PG                      CHAINE1 > CHAINE2
```

```
)R2  STMT   SOURCE STATEMENT                                                    ASM 0201 10.45

          BL      PP                          CHAINE1 < CHAINE2
EGAL      SR      R0,R0                       I = 0
          B       FINI
PP        L       R0,M1                       I = -1
          B       FINI
PG        LA      R0,1                        I = 1
*************************************************************************
*              SORTIE DU PROGRAMME                                      *
*************************************************************************
FINI      RETURN  (2,12)
+FINI     DS    0H
+         LM    2,12,28(13)                          RESTORE THE REGISTERS
+         BR    14                                   RETURN
00000 COMPARE CLC     0(0,R2A1),0(R3A2)
M1        DC      F'-1'
          END
```

```
DR2  STMT   SOURCE STATEMENT                                    ASM 0201 10.45

         1 ISLA     START
         2 *
         3 *        DECALER LOGIQUEMENT A GAUCHE DE NPOS LES BITS D'UN MOT
         4 *        (SHIFT LOGICAL).
         5 *        LE MOT SOURCE RESTE INTACT
         6 *
         7 *              N=ISLA(MOT,IPOS)
         8 *
         9 *                                  MOT   PATRON DE 32 BITS A DECALER
        10 *                                        CONTENU DANS UN MOT ,VARIABLE DE
        11 *                                        TYPE QUELCONQUE
        12 *                                  IPOS ENTIER, NOMBRE DE POSITIONS A DECALER
        13 *                                       VAUT DE 0 A 32
        14 *                                  N     VARIABLE ENTIERE RECEVANT LE
        15 *                                        RESULTAT
        16         SAVE   (2,3),,*
        17+        B      10(0,15)                                  BRANCH AROUND ID
        18+        DC     AL1(4)
        19+        DC     CL4'ISLA'                                 IDENTIFIER

        20+        STM    2,3,28(13)                                SAVE REGISTERS
        21         LM     1,2,0(1)
        22         L      0,0(1)           R0=MOT
        23         L      2,0(2)           R2=IPOS
        24         SLL    0,0(2)
        25         RETURN (2,3)
        26+        LM     2,3,28(13)                                RESTORE THE REGISTERS
        27+        BR     14                                        RETURN
        28         END    ISLA
```

```
)R2  STMT   SOURCE STATEMENT                                    ASM 0201 10.46

         1 ISRA     START
         2 *
         3 *        DECALER LOGIQUEMENT A DROITE DE NPOS LES BITS D'UN MOT
         4 *        (SHIFT LOGICAL).
         5 *        LE MOT SOURCE RESTE INTACT
         6 *
         7 *              N=ISRA(MOT,IPOS)
         8 *
         9 *                                  MOT   PATRON DE 32 BITS A DECALER
        10 *                                        CONTENU DANS UN MOT ,VARIABLE DE
        11 *                                        TYPE QUELCONQUE
        12 *                                  IPOS ENTIER, NOMBRE DE POSITIONS A DECALER
        13 *                                       VAUT DE 0 A 32
        14 *                                  N     VARIABLE ENTIERE RECEVANT LE
        15 *                                        RESULTAT
        16         SAVE   (2,3),,*
        17+        B      10(0,15)                              BRANCH AROUND ID
        18+        DC     AL1(4)
        19+        DC     CL4'ISRA'                             IDENTIFIER

        20+        STM    2,3,28(13)                            SAVE REGISTERS
        21         LM     1,2,0(1)
        22         L      0,0(1)          R0=MOT
        23         L      2,0(2)          R2=IPOS
        24         SRL    0,0(2)
        25         RETURN (2,3)
        26+        LM     2,3,28(13)                            RESTORE THE REGISTERS
        27+        BR     14                                    RETURN
        28         END    ISRA
```

ST LAWRENCE RIVER REGULATION STUDIES

SECTION 4

Output

1- Listing of monthly mean values that have been fixed on input cards.

2- Detailled monthly caculation of energy available at Beauharnois G.S. and Cedars G.S. according to the inflow from Cornwall. The detail of every plans will be printed if the parameter IMP on input card #18 is equal on greather than 1.

3- Monthly mean power output of Beauharnois G.S. and Cedars G.S. together and the corresponding amont in dollars, at the price specified by PRIX on input card #18, for the base case and all the other plans.

4- Output power comparaison for each month and each plan in kilowatt and the mean yearly gain or lost in dollars.

LISTE DES VALEURS MENSUELLES FIXEES DANS LA SIMULATION

MOIS	DEBIT NON PRODUCTIF PCS	DEBIT MAXIMAL TURBINABLE BEAUHARNOIS PCS	LES CEDRES PCS
JANVIER	2500.	230000.	50000.
FEVRIER	2500.	235000.	50000.
MARS	2800.	240000.	50000.
AVRIL	3100.	288000.	60000.
MAI	3200.	288000.	60000.
JUIN	3300.	288000.	60000.
JUILLET	3300.	288000.	60000.
AOUT	3300.	288000.	60000.
SEPTEMBRE	3200.	288000.	60000.
OCTOBRE	3200.	288000.	60000.
NOVEMBRE	3200.	288000.	60000.
DECEMBRE	2900.	288000.	50000.

PLAN DE REGULATION DU SAINT-LAURENT BASE 1977 AVEC DEV.

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1900	1	210000.	4147.	2500.	147.52	68.92	78.60	201647.	824468.	10000.	0.	45.80	24196.	848663.
1900	2	213000.	6048.	2500.	148.04	69.04	78.99	206548.	793791.	10000.	0.	45.80	22635.	816426.
1900	3	226000.	13527.	2800.	148.19	69.17	79.02	226727.	932865.	10000.	0.	45.80	24196.	957061.
1900	4	229000.	10058.	3100.	148.66	70.41	78.25	225958.	893380.	10000.	0.	45.80	23415.	916796.
1900	5	241000.	4543.	3200.	148.95	70.92	78.03	232343.	947238.	10000.	0.	39.00	19685.	966923.
1900	6	213000.	2040.	3300.	149.78	69.50	80.28	201740.	811799.	10000.	0.	39.00	19050.	830849.
1900	7	217000.	1407.	3300.	149.85	69.42	80.43	205107.	854557.	10000.	0.	39.00	19685.	874242.
1900	8	220000.	1335.	3300.	149.85	69.25	80.60	208035.	868518.	10000.	0.	39.00	19685.	888203.
1900	9	244000.	1217.	3200.	149.43	69.42	80.01	232017.	932072.	10000.	0.	39.00	19050.	951122.
1900	10	245000.	1747.	3200.	149.30	69.55	79.74	233547.	967006.	10000.	0.	39.00	19685.	986691.
1900	11	230000.	4782.	3200.	149.21	69.53	79.68	221582.	887791.	10000.	0.	45.80	23415.	911206.
1900	12	252000.	3387.	2900.	148.71	70.28	78.43	242487.	991354.	10000.	0.	45.80	24196.	1015550.
1901	1	220000.	1789.	2500.	147.32	69.11	78.21	209289.	853700.	10000.	0.	45.80	24196.	877896.
1901	2	220000.	1446.	2500.	147.98	68.74	79.24	208946.	777452.	10000.	0.	45.80	21854.	799306.
1901	3	204000.	12813.	2800.	148.65	68.46	80.19	204013.	847868.	10000.	0.	45.80	24196.	872064.
1901	4	239000.	17663.	3100.	148.49	71.32	77.16	243563.	953009.	10000.	0.	45.80	23415.	976424.
1901	5	253000.	5465.	3200.	148.85	71.70	77.14	245265.	991339.	10000.	0.	39.00	19685.	1011024.
1901	6	256000.	2414.	3300.	149.12	70.92	78.20	245114.	967549.	10000.	0.	39.00	19050.	986599.
1901	7	254000.	1309.	3300.	149.31	69.75	79.56	242009.	999417.	10000.	0.	39.00	19685.	1019102.
1901	8	240000.	1381.	3300.	149.50	69.10	80.41	228081.	950609.	10000.	0.	39.00	19685.	970294.
1901	9	249000.	1424.	3200.	149.39	69.35	80.04	237224.	952803.	10000.	0.	39.00	19050.	971853.
1901	10	238000.	2638.	3200.	149.36	69.10	80.26	227438.	946660.	10000.	0.	39.00	19685.	966344.
1901	11	221000.	2473.	3200.	149.40	68.74	80.66	210273.	850212.	10000.	0.	45.80	23415.	873627.
1901	12	220000.	3728.	2900.	149.06	69.23	79.83	210828.	873726.	10000.	0.	45.80	24196.	897922.
1902	1	218000.	2848.	2500.	147.34	69.04	78.30	208348.	850428.	10000.	0.	45.80	24196.	874624.
1902	2	211000.	1974.	2500.	148.20	68.49	79.71	200474.	748426.	10000.	0.	45.80	21854.	770281.
1902	3	226000.	21143.	2800.	148.09	70.55	77.54	234343.	951206.	10000.	0.	45.80	24196.	975401.
1902	4	241000.	12959.	3100.	148.50	70.97	77.53	240859.	945671.	10000.	0.	45.80	23415.	969086.
1902	5	226000.	6190.	3200.	149.14	70.67	78.47	218990.	896343.	10000.	0.	39.00	19685.	916028.
1902	6	216000.	2696.	3300.	149.69	70.08	79.60	205396.	821375.	10000.	0.	39.00	19050.	840425.
1902	7	250000.	1828.	3300.	149.33	70.26	79.07	238528.	981152.	10000.	0.	39.00	19685.	1000837.
1902	8	292000.	1209.	3300.	149.38	70.69	78.69	279909.	1137747.	10000.	0.	39.00	19685.	1157431.
1902	9	287000.	1132.	3200.	149.37	70.23	79.13	274932.	1087022.	10000.	0.	39.00	19050.	1106071.
1902	10	273000.	1659.	3200.	149.25	69.96	79.30	261459.	1073456.	10000.	0.	39.00	19685.	1093140.
1902	11	255000.	2763.	3200.	149.02	69.88	79.14	244563.	973388.	10000.	0.	45.80	23415.	996803.
1902	12	228000.	2992.	2900.	148.94	69.78	79.15	218092.	898336.	10000.	0.	45.80	24196.	922532.
1903	1	211000.	2414.	2500.	147.54	68.89	78.65	200914.	821758.	10000.	0.	45.80	24196.	845954.
1903	2	228000.	4432.	2500.	147.74	69.41	78.33	219932.	812036.	10000.	0.	45.80	21854.	833890.
1903	3	250000.	19156.	2800.	148.04	71.51	76.53	240000.	965466.	26356.	0.	42.96	57830.	1023296.
1903	4	271000.	9859.	3100.	148.47	71.55	76.91	267759.	1041406.	10000.	0.	45.80	23415.	1064821.
1903	5	275000.	787.	3200.	148.84	71.30	77.54	262587.	1061982.	10000.	0.	39.00	19685.	1081666.
1903	6	253000.	1253.	3300.	149.14	70.31	78.83	240953.	956863.	10000.	0.	39.00	19050.	975912.
1903	7	255000.	958.	3300.	149.31	70.13	79.17	242658.	998581.	10000.	0.	39.00	19685.	1018266.
1903	8	266000.	900.	3300.	149.36	70.01	79.36	253600.	1043473.	10000.	0.	39.00	19685.	1063157.
1903	9	274000.	676.	3200.	149.37	69.80	79.56	261476.	1041275.	10000.	0.	39.00	19050.	1060324.
1903	10	264000.	1045.	3200.	149.23	69.88	79.35	251845.	1036499.	10000.	0.	39.00	19685.	1056183.
1903	11	244000.	659.	3200.	149.09	69.15	79.95	231459.	929329.	10000.	0.	45.80	23415.	952744.
1903	12	216000.	523.	2900.	149.22	68.49	80.73	203623.	850783.	10000.	0.	45.80	24196.	874979.

81-06-15 10:51

PLAN DE REGULATION DU SAINT-LAURENT BASE 1977 AVEC DEV.

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1904	1	210000.	981.	2500.	147.61	68.46	79.15	198481.	815431.	10000.	0.	45.80	24196.	839627.
1904	2	211000.	1642.	2500.	148.21	68.49	79.72	200142.	773898.	10000.	0.	45.80	22635.	796532.
1904	3	227000.	11724.	2800.	148.20	69.48	78.73	225924.	927039.	10000.	0.	45.80	24196.	951235.
1904	4	265000.	16601.	3100.	148.47	71.68	76.79	268501.	1043048.	10000.	0.	45.80	23415.	1066463.
1904	5	281000.	7910.	3200.	148.84	73.10	75.75	275710.	1095761.	10000.	0.	39.00	19685.	1115445.
1904	6	289000.	2937.	3300.	149.12	72.87	76.25	278637.	1075116.	10000.	0.	39.00	19050.	1094165.
1904	7	294000.	1636.	3300.	149.30	71.22	78.08	282336.	1141027.	10000.	0.	39.00	19685.	1160711.
1904	8	304000.	1244.	3300.	149.38	70.94	78.44	288000.	1165223.	13944.	0.	39.00	27440.	1192663.
1904	9	295000.	1730.	3200.	149.37	70.64	78.73	283530.	1114355.	10000.	0.	39.00	19050.	1133404.
1904	10	278000.	3485.	3200.	149.25	70.72	78.54	268285.	1092611.	10000.	0.	39.00	19685.	1112295.
1904	11	251000.	2265.	3200.	149.03	69.75	79.28	240065.	957247.	10000.	0.	45.80	23415.	980662.
1904	12	212000.	928.	2900.	149.30	68.80	80.51	200028.	833435.	10000.	0.	45.80	24196.	857630.
1905	1	210000.	1258.	2500.	147.60	68.61	78.99	198758.	815294.	10000.	0.	45.80	24196.	839490.
1905	2	208000.	1498.	2500.	148.30	68.28	80.03	196998.	737316.	10000.	0.	45.80	21854.	759170.
1905	3	204000.	9222.	2800.	148.75	68.37	80.39	200422.	834097.	10000.	0.	45.80	24196.	858293.
1905	4	209000.	14965.	3100.	148.94	69.53	79.42	210865.	842253.	10000.	0.	45.80	23415.	865668.
1905	5	223000.	3726.	3200.	149.24	70.11	79.14	213526.	879135.	10000.	0.	39.00	19685.	898820.
1905	6	249000.	1762.	3300.	149.17	70.31	78.86	237462.	943535.	10000.	0.	39.00	19050.	962585.
1905	7	275000.	1075.	3300.	149.30	70.36	78.94	262775.	1075235.	10000.	0.	39.00	19685.	1094919.
1905	8	288000.	915.	3300.	149.38	70.41	78.97	275615.	1124309.	10000.	0.	39.00	19685.	1143993.
1905	9	288000.	952.	3200.	149.37	70.34	79.03	275752.	1089084.	10000.	0.	39.00	19050.	1108133.
1905	10	272000.	1741.	3200.	149.25	69.96	79.30	260541.	1069910.	10000.	0.	39.00	19685.	1089594.
1905	11	252000.	2556.	3200.	149.03	69.55	79.48	241356.	963949.	10000.	0.	45.80	23415.	987365.
1905	12	232000.	2403.	2900.	148.89	69.32	79.56	221503.	916022.	10000.	0.	45.80	24196.	940218.
1906	1	220000.	2886.	2500.	147.29	69.20	78.09	210386.	857344.	10000.	0.	45.80	24196.	881540.
1906	2	249000.	2299.	2500.	147.52	69.97	77.56	235000.	861652.	13799.	0.	45.14	29301.	890953.
1906	3	244000.	8922.	2800.	148.04	69.66	78.38	240000.	981024.	10122.	0.	45.78	24465.	1005489.
1906	4	236000.	14699.	3100.	148.53	69.83	78.70	237599.	942735.	10000.	0.	45.80	23415.	966151.
1906	5	227000.	3648.	3200.	149.17	70.34	78.83	217448.	892938.	10000.	0.	39.00	19685.	912623.
1906	6	226000.	1951.	3300.	149.48	70.23	79.25	214651.	856250.	10000.	0.	39.00	19050.	875300.
1906	7	247000.	1397.	3300.	149.36	69.68	79.68	235097.	972719.	10000.	0.	39.00	19685.	992404.
1906	8	261000.	771.	3300.	149.37	69.53	79.84	248471.	1027691.	10000.	0.	39.00	19685.	1047376.
1906	9	258000.	801.	3200.	149.35	69.30	80.05	245601.	985407.	10000.	0.	39.00	19050.	1004457.
1906	10	250000.	1719.	3200.	149.26	69.12	80.14	238519.	990673.	10000.	0.	39.00	19685.	1010358.
1906	11	258000.	1237.	3200.	149.01	69.40	79.61	246037.	983216.	10000.	0.	45.80	23415.	1006632.
1906	12	252000.	2238.	2900.	148.71	69.78	78.93	241338.	991127.	10000.	0.	45.80	24196.	1015323.
1907	1	220000.	2719.	2500.	147.30	69.11	78.19	210219.	857426.	10000.	0.	45.80	24196.	881621.
1907	2	254000.	1947.	2500.	147.52	69.69	77.83	235000.	863755.	18447.	0.	44.33	38090.	901845.
1907	3	253000.	10545.	2800.	148.04	69.91	78.14	240000.	978899.	20745.	0.	43.93	46838.	1025737.
1907	4	254000.	15996.	3100.	148.46	70.39	78.07	256896.	1011053.	10000.	0.	45.80	23415.	1034468.
1907	5	244000.	3768.	3200.	148.92	70.97	77.95	234568.	955589.	10000.	0.	39.00	19685.	975274.
1907	6	244000.	1955.	3300.	149.21	70.61	78.60	232655.	922592.	10000.	0.	39.00	19050.	941641.
1907	7	254000.	1199.	3300.	149.31	70.11	79.20	241899.	995812.	10000.	0.	39.00	19685.	1015497.
1907	8	270000.	784.	3300.	149.37	69.91	79.47	257484.	1059631.	10000.	0.	39.00	19685.	1079315.
1907	9	270000.	912.	3200.	149.36	69.80	79.55	257712.	1027070.	10000.	0.	39.00	19050.	1046120.
1907	10	270000.	1924.	3200.	149.25	70.11	79.14	258724.	1061426.	10000.	0.	39.00	19685.	1081110.
1907	11	271000.	3263.	3200.	149.04	70.36	78.68	261063.	1031889.	10000.	0.	45.80	23415.	1055304.
1907	12	253000.	3814.	2900.	148.70	70.43	78.27	243914.	995647.	10000.	0.	45.80	24196.	1019843.

81-06-15-10:51

PLAN DE REGULATION DU SAINT-LAURENT BASE 1977 AVEC DEV.

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1908	1	220000.	2386.	2500.	147.30	69.20	78.10	209886.	855343.	10000.	0.	45.80	24196.	879538.
1908	2	255000.	4609.	2500.	147.52	70.09	77.43	235000.	891463.	22109.	0.	43.70	46365.	937828.
1908	3	264000.	17779.	2800.	148.04	70.58	77.46	240000.	973137.	38979.	0.	40.76	80473.	1053609.
1908	4	279000.	10476.	3100.	148.47	71.43	77.04	276376.	1073737.	10000.	0.	45.80	23415.	1097152.
1908	5	292000.	8095.	3200.	148.84	73.91	74.94	286895.	1129750.	10000.	0.	39.00	19685.	1149434.
1908	6	297000.	2615.	3300.	149.12	72.46	76.66	286315.	1105829.	10000.	0.	39.00	19050.	1124878.
1908	7	298000.	1283.	3300.	149.30	71.07	78.23	285983.	1155869.	10000.	0.	39.00	19685.	1175553.
1908	8	296000.	1045.	3300.	149.38	70.49	78.89	283745.	1153883.	10000.	0.	39.00	19685.	1173567.
1908	9	271000.	801.	3200.	149.36	69.68	79.68	258601.	1031579.	10000.	0.	39.00	19050.	1050629.
1908	10	254000.	467.	3200.	149.25	69.17	80.07	241267.	1001135.	10000.	0.	39.00	19685.	1020820.
1908	11	227000.	296.	3200.	149.33	68.54	80.79	214096.	866946.	10000.	0.	45.80	23415.	890361.
1908	12	212000.	101.	2900.	149.33	68.43	80.90	199201.	833229.	10000.	0.	45.80	24196.	857425.
1909	1	210000.	3914.	2500.	147.53	68.49	79.04	201414.	827043.	10000.	0.	45.80	24196.	851239.
1909	2	209000.	4816.	2500.	148.18	68.52	79.66	201316.	751274.	10000.	0.	45.80	21854.	773129.
1909	3	222000.	15078.	2800.	148.23	68.92	79.31	224278.	925253.	10000.	0.	45.80	24196.	949448.
1909	4	225000.	11783.	3100.	148.70	70.54	78.16	223683.	883615.	10000.	0.	45.80	23415.	907030.
1909	5	262000.	8696.	3200.	148.84	73.20	75.64	257496.	1026271.	10000.	0.	39.00	19685.	1045955.
1909	6	274000.	2857.	3300.	149.12	72.13	76.99	263557.	1026592.	10000.	0.	39.00	19050.	1045642.
1909	7	276000.	1477.	3300.	149.30	70.59	78.71	264177.	1078530.	10000.	0.	39.00	19685.	1098214.
1909	8	275000.	965.	3300.	149.38	70.36	79.02	262665.	1075565.	10000.	0.	39.00	19685.	1095249.
1909	9	260000.	1175.	3200.	149.35	69.78	79.57	247975.	990233.	10000.	0.	39.00	19050.	1009283.
1909	10	243000.	1379.	3200.	149.32	69.27	80.04	231179.	960043.	10000.	0.	39.00	19685.	979728.
1909	11	222000.	2745.	3200.	149.38	68.72	80.66	211545.	855424.	10000.	0.	45.80	23415.	878839.
1909	12	216000.	1568.	2900.	149.19	68.92	80.27	204668.	851327.	10000.	0.	45.80	24196.	875523.
1910	1	210000.	2324.	2500.	147.57	68.77	78.80	199824.	818354.	10000.	0.	45.80	24196.	842550.
1910	2	207000.	3249.	2500.	148.28	68.49	79.79	197749.	738442.	10000.	0.	45.80	21854.	760297.
1910	3	224000.	10045.	2800.	148.28	69.60	78.68	221245.	907392.	10000.	0.	45.80	24196.	931588.
1910	4	231000.	14994.	3100.	148.57	70.41	78.16	232894.	919937.	10000.	0.	45.80	23415.	943352.
1910	5	244000.	6148.	3200.	148.90	70.56	78.34	236948.	968425.	10000.	0.	39.00	19685.	988110.
1910	6	246000.	2491.	3300.	149.19	70.16	79.03	235191.	936131.	10000.	0.	39.00	19050.	955180.
1910	7	243000.	1456.	3300.	149.40	69.25	80.15	231156.	960888.	10000.	0.	39.00	19685.	980573.
1910	8	251000.	1280.	3300.	149.40	69.30	80.10	238980.	992215.	10000.	0.	39.00	19685.	1011900.
1910	9	256000.	1315.	3200.	149.36	69.55	79.80	244115.	977479.	10000.	0.	39.00	19050.	996529.
1910	10	252000.	2813.	3200.	149.24	69.50	79.74	241613.	999522.	10000.	0.	39.00	19685.	1019207.
1910	11	237000.	2737.	3200.	149.14	69.25	79.90	226537.	909397.	10000.	0.	45.80	23415.	932812.
1910	12	216000.	929.	2900.	149.21	68.80	80.41	204029.	849780.	10000.	0.	45.80	24196.	873976.
1911	1	210000.	1282.	2500.	147.60	68.58	79.02	198782.	815643.	10000.	0.	45.80	24196.	839838.
1911	2	209000.	1578.	2500.	148.27	68.37	79.90	198078.	740579.	10000.	0.	45.80	21854.	762434.
1911	3	208000.	5492.	2800.	148.75	68.24	80.50	200692.	836247.	10000.	0.	45.80	24196.	860443.
1911	4	192000.	15527.	3100.	149.38	68.94	80.44	194427.	782542.	10000.	0.	45.80	23415.	805957.
1911	5	201000.	3443.	3200.	149.83	70.21	79.62	191243.	787999.	10000.	0.	39.00	19685.	807684.
1911	6	212000.	1779.	3300.	149.81	69.53	80.29	200479.	806627.	10000.	0.	39.00	19050.	825676.
1911	7	220000.	1208.	3300.	149.79	68.79	81.00	207908.	871445.	10000.	0.	39.00	19685.	891130.
1911	8	223000.	949.	3300.	149.79	68.54	81.25	210649.	885374.	10000.	0.	39.00	19685.	905059.
1911	9	223000.	1159.	3200.	149.75	68.46	81.29	210959.	858394.	10000.	0.	39.00	19050.	877444.
1911	10	224000.	1738.	3200.	149.59	68.49	81.10	212538.	892014.	10000.	0.	39.00	19685.	911698.
1911	11	233000.	2393.	3200.	149.20	68.79	80.41	222193.	896418.	10000.	0.	45.80	23415.	919833.
1911	12	236000.	3873.	2900.	148.82	69.66	79.16	226973.	935028.	10000.	0.	45.80	24196.	959224.

81-06-15-10:51

PLAN DE REGULATION DU SAINT-LAURENT BASE 1977 AVEC DEV.

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1912	1	220000.	1934.	2500.	147.31	69.17	78.15	209434.	853781.	10000.	0.	45.80	24196.	877977.
1912	2	228000.	1850.	2500.	147.79	68.98	78.81	217350.	834784.	10000.	0.	45.80	22635.	857419.
1912	3	223000.	5169.	2800.	148.39	68.80	79.59	215369.	890720.	10000.	0.	45.80	24196.	914916.
1912	4	238000.	18341.	3100.	148.49	70.51	77.97	243241.	958460.	10000.	0.	45.80	23415.	981875.
1912	5	262000.	9384.	3200.	148.84	71.68	77.16	258184.	1041739.	10000.	0.	39.00	19685.	1061423.
1912	6	273000.	3156.	3300.	149.12	71.96	77.16	262856.	1025498.	10000.	0.	39.00	19050.	1044547.
1912	7	282000.	1614.	3300.	149.30	70.69	78.61	270314.	1100973.	10000.	0.	39.00	19685.	1120657.
1912	8	278000.	1057.	3300.	149.38	70.13	79.25	265757.	1089532.	10000.	0.	39.00	19685.	1109216.
1912	9	270000.	1527.	3200.	149.36	69.96	79.40	258327.	1028048.	10000.	0.	39.00	19050.	1047097.
1912	10	268000.	3212.	3200.	149.24	69.91	79.34	258012.	1060494.	10000.	0.	39.00	19685.	1080178.
1912	11	268000.	5268.	3200.	149.04	70.92	78.12	260068.	1023335.	10000.	0.	45.80	23415.	1046750.
1912	12	252000.	4809.	2900.	148.70	70.74	77.96	243909.	992963.	10000.	0.	45.80	24196.	1017159.
1913	1	220000.	5811.	2500.	147.22	69.94	77.29	213311.	863090.	10000.	0.	45.80	24196.	887286.
1913	2	256000.	3726.	2500.	147.52	70.58	76.94	235000.	857042.	22226.	0.	43.67	44976.	902018.
1913	3	265000.	20803.	2800.	148.04	71.45	76.60	240000.	965970.	43003.	0.	40.06	87084.	1053054.
1913	4	284000.	11544.	3100.	148.47	72.16	76.31	282444.	1089128.	10000.	0.	45.80	23415.	1112543.
1913	5	290000.	6008.	3200.	148.84	72.08	76.76	282808.	1130775.	10000.	0.	39.00	19685.	1150459.
1913	6	294000.	2241.	3300.	149.12	71.12	78.00	282941.	1105675.	10000.	0.	39.00	19050.	1124724.
1913	7	282000.	1119.	3300.	149.30	70.16	79.14	269819.	1104020.	10000.	0.	39.00	19685.	1123704.
1913	8	274000.	832.	3300.	149.38	69.73	79.65	261532.	1077055.	10000.	0.	39.00	19685.	1096739.
1913	9	266000.	1033.	3200.	149.35	69.60	79.74	253833.	1014134.	10000.	0.	39.00	19050.	1033184.
1913	10	254000.	2922.	3200.	149.24	69.37	79.86	243722.	1009028.	10000.	0.	39.00	19685.	1028713.
1913	11	251000.	3900.	3200.	149.03	69.86	79.17	241700.	962645.	10000.	0.	45.80	23415.	986060.
1913	12	235000.	2533.	2900.	148.84	69.97	78.88	224633.	923018.	10000.	0.	45.80	24196.	947214.
1914	1	212000.	2834.	2500.	147.50	68.74	78.76	202334.	828742.	10000.	0.	45.80	24196.	852938.
1914	2	230000.	1754.	2500.	147.76	69.17	78.59	219254.	811456.	10000.	0.	45.80	21854.	833311.
1914	3	221000.	5120.	2800.	148.43	68.92	79.51	213320.	881447.	10000.	0.	45.80	24196.	905643.
1914	4	241000.	16399.	3100.	148.48	69.96	78.53	244299.	967153.	10000.	0.	45.80	23415.	990568.
1914	5	256000.	2474.	3200.	148.85	70.61	78.23	245274.	1000699.	10000.	0.	39.00	19685.	1020384.
1914	6	260000.	1472.	3300.	149.11	69.91	79.21	248172.	987834.	10000.	0.	39.00	19050.	1006884.
1914	7	258000.	837.	3300.	149.30	69.63	79.67	245537.	1014489.	10000.	0.	39.00	19685.	1034174.
1914	8	251000.	894.	3300.	149.41	69.12	80.28	238594.	992295.	10000.	0.	39.00	19685.	1011979.
1914	9	260000.	954.	3200.	149.35	69.27	80.07	247754.	993872.	10000.	0.	39.00	19050.	1012922.
1914	10	253000.	1191.	3200.	149.25	69.10	80.15	240991.	1000731.	10000.	0.	39.00	19685.	1020416.
1914	11	234000.	2064.	3200.	149.19	68.69	80.50	222864.	899905.	10000.	0.	45.80	23415.	923320.
1914	12	216000.	1562.	2900.	149.19	68.68	80.52	204662.	853423.	10000.	0.	45.80	24196.	877619.
1915	1	210000.	3706.	2500.	147.53	68.49	79.04	201206.	826203.	10000.	0.	45.80	24196.	850399.
1915	2	216000.	5193.	2500.	147.98	68.68	79.31	208693.	776999.	10000.	0.	45.80	21854.	798854.
1915	3	228000.	11267.	2800.	148.19	69.11	79.09	226467.	932363.	10000.	0.	45.80	24196.	956559.
1915	4	202000.	11575.	3100.	149.20	68.61	80.59	200475.	809103.	10000.	0.	45.80	23415.	832518.
1915	5	195000.	3602.	3200.	150.03	68.92	81.11	185402.	774798.	10000.	0.	39.00	19685.	794483.
1915	6	212000.	1692.	3300.	149.82	68.82	81.00	200392.	812188.	10000.	0.	39.00	19050.	831238.
1915	7	220000.	920.	3300.	149.79	68.74	81.05	207620.	870723.	10000.	0.	39.00	19685.	890408.
1915	8	236000.	677.	3300.	149.57	68.97	80.60	223377.	932891.	10000.	0.	39.00	19685.	952576.
1915	9	270000.	710.	3200.	149.36	69.70	79.65	257510.	1027209.	10000.	0.	39.00	19050.	1046259.
1915	10	264000.	589.	3200.	149.23	69.65	79.57	251389.	1036781.	10000.	0.	39.00	19685.	1056465.
1915	11	248000.	1051.	3200.	149.06	69.15	79.91	235851.	946290.	10000.	0.	45.80	23415.	969705.
1915	12	217000.	1864.	2900.	149.16	68.74	80.43	205964.	858198.	10000.	0.	45.80	24196.	882394.

81-06-15-10:51

PLAN DE REGULATION DU SAINT-LAURENT BASE 1977 AVEC DEV.

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1916	1	219000.	4284.	2500.	147.28	69.17	78.11	210784.	859187.	10000.	0.	45.80	24196.	883383.
1916	2	244000.	3453.	2500.	147.52	69.97	77.56	234953.	892253.	10000.	0.	45.80	22635.	914888.
1916	3	242000.	6961.	2800.	148.08	69.72	78.35	236161.	965399.	10000.	0.	45.80	24196.	989595.
1916	4	256000.	14205.	3100.	148.46	71.73	76.73	257105.	1000566.	10000.	0.	45.80	23415.	1023982.
1916	5	272000.	6900.	3200.	148.84	73.00	75.85	265700.	1059198.	10000.	0.	39.00	19685.	1078882.
1916	6	288000.	2549.	3300.	149.12	72.16	76.96	277249.	1076188.	10000.	0.	39.00	19050.	1095237.
1916	7	302000.	1574.	3300.	149.30	71.22	78.08	288000.	1161836.	12274.	0.	39.00	24156.	1185992.
1916	8	304000.	815.	3300.	149.38	70.74	78.64	288000.	1167139.	13515.	0.	39.00	26596.	1193735.
1916	9	276000.	927.	3200.	149.37	69.86	79.51	263727.	1049214.	10000.	0.	39.00	19050.	1068263.
1916	10	249000.	2051.	3200.	149.26	69.35	79.92	237851.	985954.	10000.	0.	39.00	19685.	1005639.
1916	11	228000.	3192.	3200.	149.26	69.10	80.17	217992.	877439.	10000.	0.	45.80	23415.	900854.
1916	12	215000.	2806.	2900.	149.19	69.17	80.02	204906.	850191.	10000.	0.	45.80	24196.	874387.
1917	1	210000.	3076.	2500.	147.55	68.74	78.81	200576.	821643.	10000.	0.	45.80	24196.	845839.
1917	2	217000.	2134.	2500.	148.04	68.77	79.27	206634.	768814.	10000.	0.	45.80	21854.	790668.
1917	3	224000.	7594.	2800.	148.32	69.11	79.22	218794.	901795.	10000.	0.	45.80	24196.	925990.
1917	4	258000.	16498.	3100.	148.47	71.07	77.40	261398.	1022064.	10000.	0.	45.80	23415.	1045479.
1917	5	264000.	5494.	3200.	148.83	71.63	77.21	256294.	1034860.	10000.	0.	39.00	19685.	1054544.
1917	6	270000.	2450.	3300.	149.12	71.63	77.49	259150.	1014513.	10000.	0.	39.00	19050.	1033563.
1917	7	290000.	1642.	3300.	149.30	71.32	77.98	278342.	1125289.	10000.	0.	39.00	19685.	1144973.
1917	8	305000.	1540.	3300.	149.38	71.20	78.19	288000.	1162842.	15240.	0.	39.00	29988.	1192830.
1917	9	298000.	1253.	3200.	149.37	70.64	78.73	286053.	1123357.	10000.	0.	39.00	19050.	1142406.
1917	10	282000.	2993.	3200.	149.25	70.21	79.04	271793.	1110587.	10000.	0.	39.00	19685.	1130271.
1917	11	282000.	2531.	3200.	149.04	70.41	78.63	271331.	1069351.	10000.	0.	45.80	23415.	1092766.
1917	12	257000.	1212.	2900.	148.70	70.09	78.61	245312.	1004124.	10000.	C.	45.80	24196.	1028320.
1918	1	218000.	1070.	2500.	147.39	68.71	78.68	206570.	846054.	10000.	0.	45.80	24196.	870250.
1918	2	226000.	3353.	2500.	147.80	68.92	78.88	216853.	804674.	10000.	0.	45.80	21854.	826528.
1918	3	252000.	8268.	2800.	148.04	69.97	78.07	240000.	978370.	17468.	0.	44.50	40154.	1018525.
1918	4	268000.	14279.	3100.	148.47	71.32	77.14	269179.	1048525.	10000.	0.	45.80	23415.	1071939.
1918	5	255000.	4946.	3200.	148.84	70.99	77.85	246746.	1003167.	10000.	0.	39.00	19685.	1022852.
1918	6	241000.	2200.	3300.	149.24	70.01	79.24	229900.	917106.	10000.	0.	39.00	19050.	936156.
1918	7	246000.	1401.	3300.	149.37	69.88	79.49	234101.	966967.	10000.	0.	39.00	19685.	986651.
1918	8	249000.	900.	3300.	149.42	69.37	80.05	236600.	982073.	10000.	0.	39.00	19685.	1001757.
1918	9	256000.	1522.	3200.	149.35	69.60	79.75	244322.	977827.	10000.	0.	39.00	19050.	996876.
1918	10	260000.	4415.	3200.	149.23	70.34	78.89	251215.	1029907.	10000.	0.	39.00	19685.	1049591.
1918	11	270000.	7483.	3200.	149.04	71.07	77.97	264283.	1037661.	10000.	0.	45.80	23415.	1061076.
1918	12	246000.	6238.	2900.	148.72	70.55	78.17	239338.	976513.	10000.	0.	45.80	24196.	1000709.
1919	1	220000.	3452.	2500.	147.28	69.41	77.86	210952.	857865.	10000.	0.	45.80	24196.	882061.
1919	2	248000.	1885.	2500.	147.52	69.81	77.71	235000.	862818.	12385.	0.	45.39	26557.	889375.
1919	3	250000.	10480.	2800.	148.04	70.52	77.52	240000.	973655.	17680.	0.	44.47	40593.	1014248.
1919	4	258000.	16789.	3100.	148.47	71.32	77.14	261689.	1021005.	10000.	0.	45.80	23415.	1044421.
1919	5	274000.	6768.	3200.	148.84	72.87	75.97	267568.	1067308.	10000.	0.	39.00	19685.	1086992.
1919	6	294000.	2751.	3300.	149.12	72.13	76.99	283451.	1098555.	10000.	0.	39.00	19050.	1117604.
1919	7	299000.	1669.	3300.	149.30	70.82	78.48	287369.	1163331.	10000.	0.	39.00	19685.	1183015.
1919	8	292000.	900.	3300.	149.38	70.26	79.12	279600.	1140651.	10000.	0.	39.00	19685.	1160335.
1919	9	272000.	1012.	3200.	149.37	69.88	79.49	259812.	1034356.	10000.	0.	39.00	19050.	1053405.
1919	10	257000.	2736.	3200.	149.23	69.86	79.37	246536.	1015802.	10000.	0.	39.00	19685.	1035487.
1919	11	249000.	3694.	3200.	149.04	70.11	78.93	239494.	952024.	10000.	0.	45.80	23415.	975440.
1919	12	218000.	1681.	2900.	149.15	69.54	79.61	206781.	854685.	10000.	0.	45.80	24196.	878881.

81-06-15-10:51

PLAN DE REGULATION DU SAINT-LAURENT BASE 1977 AVEC DEV.

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1920	1	210000.	918.	2500.	147.61	68.71	78.91	198418.	813166.	10000.	0.	45.80	24196.	837361.
1920	2	209000.	1278.	2500.	148.28	68.55	79.73	197778.	764445.	10000.	0.	45.80	22635.	787080.
1920	3	206000.	8627.	2800.	148.71	68.92	79.79	201827.	835099.	10000.	0.	45.80	24196.	859295.
1920	4	200000.	19470.	3100.	149.05	69.60	79.45	206370.	824100.	10000.	0.	45.80	23415.	847516.
1920	5	200000.	3454.	3200.	149.86	69.50	80.36	190254.	789825.	10000.	0.	39.00	19685.	809510.
1920	6	217000.	1996.	3300.	149.68	69.02	80.66	205696.	831358.	10000.	0.	39.00	19050.	850407.
1920	7	220000.	1017.	3300.	149.79	68.89	80.90	207717.	869779.	10000.	0.	39.00	19685.	889464.
1920	8	251000.	987.	3300.	149.40	69.50	79.90	238687.	989218.	10000.	0.	39.00	19685.	1008903.
1920	9	268000.	1184.	3200.	149.35	69.75	79.60	255984.	1020960.	10000.	0.	39.00	19050.	1040010.
1920	10	263000.	2158.	3200.	149.23	69.55	79.68	251958.	1039951.	10000.	0.	39.00	19685.	1059635.
1920	11	256000.	2242.	3200.	149.02	69.58	79.44	245042.	977857.	10000.	0.	45.80	23415.	1001272.
1920	12	250000.	5378.	2900.	148.71	70.21	78.49	242478.	991855.	10000.	0.	45.80	24196.	1016051.
1921	1	220000.	2749.	2500.	147.29	69.04	78.25	210249.	858048.	10000.	0.	45.80	24196.	882243.
1921	2	248000.	1931.	2500.	147.52	69.60	77.93	235000.	864460.	12431.	0.	45.38	26647.	891107.
1921	3	254000.	13560.	2800.	148.04	71.20	76.84	240000.	967999.	24760.	0.	43.23	54762.	1022760.
1921	4	261000.	14187.	3100.	148.47	71.40	77.07	262087.	1021839.	10000.	0.	45.80	23415.	1045254.
1921	5	258000.	1422.	3200.	148.84	70.84	78.00	246222.	1002432.	10000.	0.	39.00	19685.	1022117.
1921	6	246000.	1206.	3300.	149.20	69.60	79.60	233906.	935950.	10000.	0.	39.00	19050.	955000.
1921	7	241000.	635.	3300.	149.43	69.10	80.33	228335.	950992.	10000.	0.	39.00	19685.	970677.
1921	8	238000.	827.	3300.	149.54	68.94	80.59	225527.	941745.	10000.	0.	39.00	19685.	961430.
1921	9	232000.	1014.	3200.	149.59	68.69	80.90	219814.	891083.	10000.	0.	39.00	19050.	910133.
1921	10	228000.	2472.	3200.	149.50	68.69	80.81	217272.	909372.	10000.	0.	39.00	19685.	929056.
1921	11	230000.	2449.	3200.	149.24	68.89	80.35	219249.	884070.	10000.	0.	45.80	23415.	907485.
1921	12	233000.	1881.	2900.	148.88	69.45	79.43	221981.	916878.	10000.	0.	45.80	24196.	941074.
1922	1	212000.	1060.	2500.	147.55	68.68	78.87	200560.	822080.	10000.	0.	45.80	24196.	846276.
1922	2	215000.	1320.	2500.	148.11	68.68	79.43	203820.	759258.	10000.	0.	45.80	21854.	781112.
1922	3	228000.	26997.	2800.	148.04	69.66	78.38	240000.	981024.	12197.	0.	45.42	28996.	1010020.
1922	4	246000.	16413.	3100.	148.46	71.75	76.71	249313.	971171.	10000.	0.	45.80	23415.	994587.
1922	5	264000.	3547.	3200.	148.83	71.93	76.90	254347.	1024716.	10000.	0.	39.00	19685.	1044401.
1922	6	265000.	11774.	3300.	149.12	70.56	78.56	263474.	1039769.	10000.	0.	39.00	19050.	1058818.
1922	7	281000.	4152.	3300.	149.30	70.46	78.84	271852.	1108895.	10000.	0.	39.00	19685.	1128579.
1922	8	273000.	8026.	3300.	149.38	69.96	79.43	267726.	1098712.	10000.	0.	39.00	19685.	1118396.
1922	9	266000.	3669.	3200.	149.35	69.65	79.70	256469.	1023709.	10000.	0.	39.00	19050.	1042759.
1922	10	248000.	3311.	3200.	149.26	69.15	80.12	238111.	988820.	10000.	0.	39.00	19685.	1008505.
1922	11	224000.	4136.	3200.	149.31	68.54	80.78	214936.	870239.	10000.	0.	45.80	23415.	893654.
1922	12	212000.	3798.	2900.	149.23	68.46	80.77	202898.	848089.	10000.	0.	45.80	24196.	872285.
1923	1	210000.	2188.	2500.	147.58	68.40	79.18	199688.	820823.	10000.	0.	45.80	24196.	845019.
1923	2	207000.	640.	2500.	148.36	68.24	80.12	195140.	730721.	10000.	0.	45.80	21854.	752576.
1923	3	204000.	3252.	2800.	148.93	68.24	80.69	194452.	810842.	10000.	0.	45.80	24196.	835038.
1923	4	194000.	25752.	3100.	149.04	68.87	80.17	206652.	831236.	10000.	0.	45.80	23415.	854652.
1923	5	197000.	10450.	3200.	149.74	70.67	79.07	194250.	796559.	10000.	0.	39.00	19685.	816244.
1923	6	223000.	5445.	3300.	149.47	69.96	79.52	215145.	860466.	10000.	0.	39.00	19050.	879516.
1923	7	236000.	1202.	3300.	149.49	69.32	80.17	223902.	931226.	10000.	0.	39.00	19685.	950911.
1923	8	236000.	844.	3300.	149.56	68.99	80.57	223544.	933335.	10000.	0.	39.00	19685.	953019.
1923	9	241000.	758.	3200.	149.47	69.15	80.32	228558.	921112.	10000.	0.	39.00	19050.	940162.
1923	10	225000.	872.	3200.	149.59	68.61	80.97	212672.	891430.	10000.	0.	39.00	19685.	911115.
1923	11	222000.	2353.	3200.	149.39	68.64	80.75	211153.	854531.	10000.	0.	45.80	23415.	877946.
1923	12	234000.	6246.	2900.	148.81	69.72	79.09	227346.	935988.	10000.	0.	45.80	24196.	960184.

81-06-15-10:51

PLAN DE REGULATION DU SAINT-LAURENT BASE 1977 AVEC DEV.

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1924	1	220000.	2730.	2500.	147.30	69.26	78.03	210230.	856220.	10000.	0.	45.80	24196.	880416.
1924	2	234000.	1897.	2500.	147.68	69.38	78.30	223397.	854159.	10000.	0.	45.80	22635.	876794.
1924	3	226000.	4242.	2800.	148.35	69.32	79.03	217442.	894560.	10000.	0.	45.80	24196.	918756.
1924	4	224000.	19564.	3100.	148.60	70.21	78.39	230464.	912312.	10000.	0.	45.80	23415.	935727.
1924	5	242000.	7817.	3200.	148.90	71.73	77.18	236617.	957284.	10000.	0.	39.00	19685.	976969.
1924	6	253000.	1182.	3300.	149.14	70.74	78.40	240882.	952954.	10000.	0.	39.00	19050.	972004.
1924	7	257000.	880.	3300.	149.30	69.91	79.39	244580.	1008200.	10000.	0.	39.00	19685.	1027884.
1924	8	262000.	1575.	3300.	149.36	69.73	79.64	250275.	1032946.	10000.	0.	39.00	19685.	1052631.
1924	9	253000.	1378.	3200.	149.37	69.48	79.89	241178.	966888.	10000.	0.	39.00	19050.	985938.
1924	10	254000.	4635.	3200.	149.23	69.75	79.48	245435.	1012366.	10000.	0.	39.00	19685.	1032051.
1924	11	232000.	2856.	3200.	149.21	69.02	80.19	221656.	892372.	10000.	0.	45.80	23415.	915787.
1924	12	212000.	3857.	2900.	149.23	68.98	80.25	202957.	843822.	10000.	0.	45.80	24196.	868018.
1925	1	210000.	950.	2500.	147.61	68.49	79.12	198450.	815054.	10000.	0.	45.80	24196.	839249.
1925	2	207000.	5028.	2500.	148.23	68.80	79.43	199528.	742649.	10000.	0.	45.80	21854.	764503.
1925	3	214000.	18582.	2800.	148.30	69.72	78.58	219782.	900527.	10000.	0.	45.80	24196.	924723.
1925	4	227000.	6678.	3100.	148.75	70.54	78.21	220578.	871665.	10000.	0.	45.80	23415.	895080.
1925	5	216000.	2989.	3200.	149.42	70.01	79.41	205789.	848814.	10000.	0.	39.00	19685.	868498.
1925	6	213000.	1646.	3300.	149.79	69.50	80.29	201346.	810248.	10000.	0.	39.00	19050.	829298.
1925	7	217000.	1410.	3300.	149.85	69.04	80.81	205110.	857863.	10000.	0.	39.00	19685.	877548.
1925	8	220000.	1952.	3300.	149.83	68.79	81.04	208652.	875022.	10000.	0.	39.00	19685.	894707.
1925	9	221000.	4085.	3200.	149.73	68.66	81.07	211885.	860281.	10000.	0.	39.00	19050.	879331.
1925	10	216000.	5971.	3200.	149.66	68.59	81.08	208771.	875817.	10000.	0.	39.00	19685.	895502.
1925	11	216000.	5932.	3200.	149.43	68.92	80.52	208732.	842656.	10000.	0.	45.80	23415.	866071.
1925	12	226000.	4517.	2900.	148.94	69.63	79.31	217617.	897735.	10000.	0.	45.80	24196.	921931.
1926	1	210000.	2655.	2500.	147.56	68.80	78.76	200155.	819442.	10000.	0.	45.80	24196.	843637.
1926	2	207000.	1473.	2500.	148.33	68.43	79.91	195973.	732387.	10000.	0.	45.80	21854.	754241.
1926	3	204000.	1767.	2800.	148.98	68.37	80.61	192967.	803731.	10000.	0.	45.80	24196.	827927.
1926	4	188000.	22903.	3100.	149.28	68.79	80.49	197803.	797113.	10000.	0.	45.80	23415.	820528.
1926	5	199000.	6521.	3200.	149.80	70.06	79.74	192321.	793656.	10000.	0.	39.00	19685.	813340.
1926	6	209000.	4557.	3300.	149.82	69.70	80.12	200257.	804296.	10000.	0.	39.00	19050.	823346.
1926	7	216000.	4360.	3300.	149.81	69.15	80.66	207060.	864898.	10000.	0.	39.00	19685.	884582.
1926	8	220000.	3492.	3300.	149.80	68.74	81.06	210192.	881719.	10000.	0.	39.00	19685.	901404.
1926	9	224000.	2274.	3200.	149.71	68.69	81.02	213074.	864726.	10000.	0.	39.00	19050.	883776.
1926	10	254000.	5500.	3200.	149.23	69.45	79.78	246300.	1018542.	10000.	0.	39.00	19685.	1038227.
1926	11	262000.	6796.	3200.	149.02	70.36	78.66	255596.	1011242.	10000.	0.	45.80	23415.	1034657.
1926	12	260000.	2141.	2900.	148.70	70.83	77.87	249241.	1013130.	10000.	0.	45.80	24196.	1037325.
1927	1	220000.	1488.	2500.	147.33	69.29	78.03	208988.	850998.	10000.	0.	45.80	24196.	875193.
1927	2	238000.	2141.	2500.	147.62	69.91	77.71	227641.	835942.	10000.	0.	45.80	21854.	857797.
1927	3	240000.	11078.	2800.	148.06	70.77	77.29	238278.	964845.	10000.	0.	45.80	24196.	989041.
1927	4	239000.	2930.	3100.	148.62	69.86	78.77	228830.	908980.	10000.	0.	45.80	23415.	932395.
1927	5	218000.	3767.	3200.	149.35	69.48	79.88	208567.	864535.	10000.	0.	39.00	19685.	884219.
1927	6	216000.	1551.	3300.	149.72	69.40	80.32	204251.	822508.	10000.	0.	39.00	19050.	841558.
1927	7	218000.	1928.	3300.	149.82	69.12	80.70	206628.	863366.	10000.	0.	39.00	19685.	883051.
1927	8	234000.	1481.	3300.	149.58	69.27	80.31	222181.	925381.	10000.	0.	39.00	19685.	945066.
1927	9	237000.	1025.	3200.	149.52	68.99	80.52	224825.	907952.	10000.	0.	39.00	19050.	927002.
1927	10	238000.	1280.	3200.	149.37	69.12	80.25	226080.	940990.	10000.	0.	39.00	19685.	960674.
1927	11	236000.	16500.	3200.	149.04	69.96	79.08	239300.	952575.	10000.	0.	45.80	23415.	975990.
1927	12	252000.	15635.	2900.	148.71	70.95	77.75	254735.	1033575.	10000.	0.	45.80	24196.	1057771.

81-06-15-10:51

PLAN DE REGULATION DU SAINT-LAURENT BASE 1977 AVEC DEV.

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1928	1	220000.	5460.	2500.	147.23	69.72	77.51	212960.	863411.	10000.	0.	45.80	24196.	887607.
1928	2	255000.	2620.	2500.	147.52	70.52	77.00	235000.	888124.	20120.	0.	44.04	42638.	930762.
1928	3	258000.	6050.	2800.	148.04	70.68	77.37	240000.	972360.	21250.	0.	43.84	47851.	1020210.
1928	4	261000.	18189.	3100.	148.47	72.11	76.36	266089.	1030642.	10000.	0.	45.80	23415.	1054057.
1928	5	260000.	5657.	3200.	148.83	72.84	75.99	252457.	1009768.	10000.	0.	39.00	19685.	1029453.
1928	6	250000.	2667.	3300.	149.15	70.99	78.16	239367.	945070.	10000.	0.	39.00	19050.	964120.
1928	7	262000.	1862.	3300.	149.28	70.39	78.90	250562.	1027405.	10000.	0.	39.00	19685.	1047090.
1928	8	277000.	2317.	3300.	149.38	70.39	79.00	266017.	1088183.	10000.	0.	39.00	19685.	1107867.
1928	9	277000.	1653.	3200.	149.37	70.31	79.06	265453.	1051531.	10000.	0.	39.00	19050.	1070580.
1928	10	260000.	4910.	3200.	149.23	70.67	78.56	251710.	1028911.	10000.	0.	39.00	19685.	1048596.
1928	11	257000.	6010.	3200.	149.01	70.87	78.14	249810.	984941.	10000.	0.	45.80	23415.	1008356.
1928	12	247000.	2930.	2900.	148.73	70.62	78.12	237030.	966853.	10000.	0.	45.80	24196.	991048.
1929	1	220000.	1634.	2500.	147.32	69.66	77.66	209134.	848616.	10000.	0.	45.80	24196.	872812.
1929	2	254000.	1217.	2500.	147.52	70.34	77.19	235000.	858876.	17717.	0.	44.46	36733.	895609.
1929	3	262000.	14771.	2800.	148.04	71.35	76.69	240000.	966729.	33971.	0.	41.63	71835.	1038564.
1929	4	280000.	17010.	3100.	148.47	72.29	76.18	283910.	1093241.	10000.	0.	45.80	23415.	1116656.
1929	5	299000.	10096.	3200.	148.84	73.48	75.37	288000.	1137438.	17896.	0.	39.00	35210.	1172648.
1929	6	304000.	2019.	3300.	149.12	71.86	77.26	288000.	1117087.	14719.	0.	39.00	28030.	1145116.
1929	7	303000.	1414.	3300.	149.30	71.22	78.08	288000.	1161836.	13114.	0.	39.00	25808.	1187643.
1929	8	308000.	691.	3300.	149.38	70.87	78.51	288000.	1165940.	17391.	0.	39.00	34217.	1200157.
1929	9	292000.	467.	3200.	149.37	70.39	78.98	279267.	1101351.	10000.	0.	39.00	19050.	1120400.
1929	10	278000.	1005.	3200.	149.25	70.11	79.14	265805.	1088749.	10000.	0.	39.00	19685.	1108433.
1929	11	269000.	1677.	3200.	149.03	70.08	78.95	257477.	1020808.	10000.	0.	45.80	23415.	1044224.
1929	12	253000.	565.	2900.	148.71	69.97	78.74	240665.	986838.	10000.	0.	45.80	24196.	1011034.
1930	1	220000.	8800.	2500.	147.16	69.35	77.81	216300.	879703.	10000.	0.	45.80	24196.	903899.
1930	2	259000.	5146.	2500.	147.52	70.25	77.28	235000.	859566.	26646.	0.	42.91	52733.	912299.
1930	3	280000.	6757.	2800.	148.04	70.92	77.12	240000.	970299.	43957.	0.	39.89	88608.	1058906.
1930	4	294000.	15871.	3100.	148.47	71.45	77.02	288000.	1114891.	18771.	0.	44.28	41454.	1156344.
1930	5	298000.	5500.	3200.	148.84	71.60	77.24	288000.	1154095.	12300.	0.	39.00	24207.	1178302.
1930	6	289000.	4635.	3300.	149.12	71.25	77.87	280335.	1095226.	10000.	0.	39.00	19050.	1114275.
1930	7	289000.	1724.	3300.	149.30	71.22	78.08	277424.	1122800.	10000.	0.	39.00	19685.	1142484.
1930	8	278000.	1052.	3300.	149.38	70.26	79.12	265752.	1088340.	10000.	0.	39.00	19685.	1108024.
1930	9	266000.	695.	3200.	149.35	69.75	79.59	253495.	1011495.	10000.	0.	39.00	19050.	1030544.
1930	10	252000.	663.	3200.	149.26	69.40	79.86	239463.	991904.	10000.	0.	39.00	19685.	1011589.
1930	11	222000.	750.	3200.	149.42	68.64	80.78	209550.	848230.	10000.	0.	45.80	23415.	871645.
1930	12	214000.	675.	2900.	149.26	68.61	80.65	201775.	842168.	10000.	0.	45.80	24196.	866364.
1931	1	210000.	538.	2500.	147.62	68.49	79.13	198038.	813384.	10000.	0.	45.80	24196.	837580.
1931	2	207000.	671.	2500.	148.36	68.37	79.99	195171.	729904.	10000.	0.	45.80	21854.	751759.
1931	3	204000.	3732.	2800.	148.92	68.37	80.55	194932.	811753.	10000.	0.	45.80	24196.	835949.
1931	4	188000.	8092.	3100.	149.77	68.44	81.33	182992.	741283.	10000.	0.	45.80	23415.	764698.
1931	5	194000.	2836.	3200.	150.09	68.59	81.50	183636.	770322.	10000.	0.	39.00	19685.	790007.
1931	6	216000.	1547.	3300.	149.72	68.79	80.92	204247.	827586.	10000.	0.	39.00	19050.	846635.
1931	7	222000.	938.	3300.	149.75	68.61	81.14	209638.	880030.	10000.	0.	39.00	19685.	899715.
1931	8	222000.	597.	3300.	149.82	68.56	81.26	209297.	879662.	10000.	0.	39.00	19685.	899347.
1931	9	223000.	1100.	3200.	149.75	68.51	81.24	210900.	857725.	10000.	0.	39.00	19050.	876775.
1931	10	218000.	1194.	3200.	149.73	68.39	81.34	205994.	866306.	10000.	0.	39.00	19685.	885991.
1931	11	212000.	3449.	3200.	149.58	68.34	81.25	202249.	822011.	10000.	0.	45.80	23415.	845426.
1931	12	210000.	3630.	2900.	149.29	68.83	80.46	200730.	836043.	10000.	0.	45.80	24196.	860238.

81-06-15-10:51

PLAN DE REGULATION DU SAINT-LAURENT BASE 1977 AVEC DEV.

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1932	1	212000.	7582.	2500.	147.37	69.20	78.17	207082.	844100.	10000.	0.	45.80	24196.	868296.
1932	2	241000.	3347.	2500.	147.56	69.97	77.59	231847.	880831.	10000.	0.	45.80	22635.	903466.
1932	3	244000.	1202.	2800.	148.12	69.85	78.27	232402.	949531.	10000.	0.	45.80	24196.	973727.
1932	4	249000.	26203.	3100.	148.47	71.02	77.45	262103.	1025103.	10000.	0.	45.80	23415.	1048518.
1932	5	256000.	4085.	3200.	148.84	70.44	78.40	246885.	1008558.	10000.	0.	39.00	19685.	1028243.
1932	6	238000.	2011.	3300.	149.28	69.37	79.91	226711.	910189.	10000.	0.	39.00	19050.	929239.
1932	7	226000.	1437.	3300.	149.66	68.94	80.71	214137.	895317.	10000.	0.	39.00	19685.	915002.
1932	8	232000.	1445.	3300.	149.62	68.97	80.65	220145.	919899.	10000.	0.	39.00	19685.	939584.
1932	9	231000.	887.	3200.	149.61	69.30	80.31	218687.	881458.	10000.	0.	39.00	19050.	900508.
1932	10	220000.	1657.	3200.	149.67	69.45	80.22	208457.	867019.	10000.	0.	39.00	19685.	886704.
1932	11	228000.	3178.	3200.	149.26	70.16	79.10	217978.	868505.	10000.	0.	45.80	23415.	891921.
1932	12	224000.	3099.	2900.	149.00	69.72	79.28	214199.	883166.	10000.	0.	45.80	24196.	907362.
1933	1	216000.	3637.	2500.	147.37	69.38	77.99	207137.	842832.	10000.	0.	45.80	24196.	867028.
1933	2	212000.	2341.	2500.	148.16	68.92	79.24	201841.	750185.	10000.	0.	45.80	21854.	772040.
1933	3	205000.	2482.	2800.	148.92	68.61	80.31	194682.	808649.	10000.	0.	45.80	24196.	832845.
1933	4	217000.	27775.	3100.	148.59	70.99	77.59	231675.	910546.	10000.	0.	45.80	23415.	933961.
1933	5	241000.	6953.	3200.	148.92	71.10	77.83	234753.	955249.	10000.	0.	39.00	19685.	974933.
1933	6	231000.	1567.	3300.	149.40	69.53	79.87	219267.	880076.	10000.	0.	39.00	19050.	899126.
1933	7	221000.	546.	3300.	149.78	68.72	81.07	208246.	873487.	10000.	0.	39.00	19685.	893172.
1933	8	221000.	420.	3300.	149.85	68.72	81.13	208120.	873534.	10000.	0.	39.00	19685.	893218.
1933	9	222000.	522.	3200.	149.79	68.59	81.20	209322.	850869.	10000.	0.	39.00	19050.	869919.
1933	10	215000.	687.	3200.	149.81	68.39	81.42	202487.	851992.	10000.	0.	39.00	19685.	871677.
1933	11	204000.	911.	3200.	149.87	68.06	81.81	191711.	782497.	10000.	0.	45.80	23415.	805912.
1933	12	210000.	864.	2900.	149.36	68.49	80.87	197964.	827626.	10000.	0.	45.80	24196.	851822.
1934	1	210000.	1728.	2500.	147.59	68.58	79.01	199228.	817448.	10000.	0.	45.80	24196.	841644.
1934	2	207000.	986.	2500.	148.35	68.24	80.11	195486.	731994.	10000.	0.	45.80	21854.	753848.
1934	3	204000.	5696.	2800.	148.86	68.46	80.40	196896.	818973.	10000.	0.	45.80	24196.	843168.
1934	4	188000.	27500.	3100.	149.15	69.83	79.32	202400.	806727.	10000.	0.	45.80	23415.	830142.
1934	5	188000.	2663.	3200.	150.33	69.80	80.52	177463.	734614.	10000.	0.	39.00	19685.	754299.
1934	6	193000.	1245.	3300.	150.44	68.69	81.75	180945.	735937.	10000.	0.	39.00	19050.	754987.
1934	7	200000.	1131.	3300.	150.35	68.36	81.99	187831.	793094.	10000.	0.	39.00	19685.	812779.
1934	8	201000.	381.	3300.	150.40	67.93	82.47	188081.	798409.	10000.	0.	39.00	19685.	818094.
1934	9	201000.	365.	3200.	150.35	67.96	82.40	188165.	772409.	10000.	0.	39.00	19050.	791459.
1934	10	196000.	561.	3200.	150.37	67.96	82.42	183361.	777015.	10000.	0.	39.00	19685.	796700.
1934	11	198000.	911.	3200.	150.05	67.98	82.07	185711.	759135.	10000.	0.	45.80	23415.	782551.
1934	12	210000.	628.	2900.	149.36	68.92	80.44	197728.	822966.	10000.	0.	45.80	24196.	847162.
1935	1	210000.	3897.	2500.	147.53	69.08	78.45	201397.	822215.	10000.	0.	45.80	24196.	846411.
1935	2	207000.	1402.	2500.	148.34	68.68	79.66	195902.	730276.	10000.	0.	45.80	21854.	752131.
1935	3	204000.	11864.	2800.	148.68	69.14	79.54	203064.	838299.	10000.	0.	45.80	24196.	862495.
1935	4	188000.	12375.	3100.	149.62	68.77	80.85	187275.	755646.	10000.	0.	45.80	23415.	779061.
1935	5	188000.	6050.	3200.	150.20	68.66	81.53	180850.	758163.	10000.	0.	39.00	19685.	777847.
1935	6	193000.	3001.	3300.	150.36	68.34	82.04	182701.	745930.	10000.	0.	39.00	19050.	764980.
1935	7	205000.	1441.	3300.	150.18	68.56	81.62	193141.	813173.	10000.	0.	39.00	19685.	832858.
1935	8	210000.	1728.	3300.	150.09	68.39	81.70	198428.	836922.	10000.	0.	39.00	19685.	856607.
1935	9	209000.	1414.	3200.	150.08	68.26	81.82	197214.	805862.	10000.	0.	39.00	19050.	824912.
1935	10	200000.	1162.	3200.	150.22	68.03	82.19	187962.	795408.	10000.	0.	39.00	19685.	815092.
1935	11	198000.	1921.	3200.	150.02	68.13	81.89	186721.	761902.	10000.	0.	45.80	23415.	785317.
1935	12	210000.	1402.	2900.	149.34	68.74	80.61	198502.	827715.	10000.	0.	45.80	24196.	851910.

81-06-15-10:51

PLAN DE REGULATION DU SAINT-LAURENT BASE 1977 AVEC DEV.

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1936	1	210000.	770.	2500.	147.62	68.74	78.88	198270.	812316.	10000.	0.	45.80	24196.	836512.
1936	2	207000.	891.	2500.	148.35	68.46	79.89	195391.	756089.	10000.	0.	45.80	22635.	778723.
1936	3	204000.	24278.	2800.	148.39	69.88	78.51	215478.	882064.	10000.	0.	45.80	24196.	906260.
1936	4	193000.	10332.	3100.	149.52	69.35	80.17	190232.	762656.	10000.	0.	45.80	23415.	786071.
1936	5	205000.	5775.	3200.	149.64	70.72	78.92	197575.	809679.	10000.	0.	39.00	19685.	829364.
1936	6	211000.	1638.	3300.	149.85	69.58	80.27	199338.	801715.	10000.	0.	39.00	19050.	820764.
1936	7	212000.	1312.	3300.	149.98	68.54	81.45	200012.	841531.	10000.	0.	39.00	19685.	861216.
1936	8	211000.	805.	3300.	150.09	68.29	81.80	198505.	838134.	10000.	0.	39.00	19685.	857819.
1936	9	212000.	487.	3200.	150.03	68.36	81.66	199287.	813217.	10000.	0.	39.00	19050.	832267.
1936	10	206000.	1901.	3200.	150.02	68.49	81.53	194701.	819192.	10000.	0.	39.00	19685.	838877.
1936	11	202000.	6061.	3200.	149.77	68.74	81.03	194861.	789296.	10000.	0.	45.80	23415.	812711.
1936	12	210000.	3280.	2900.	149.30	68.98	80.31	200380.	833296.	10000.	0.	45.80	24196.	857492.
1937	1	210000.	6089.	2500.	147.47	69.57	77.90	203589.	827101.	10000.	0.	45.80	24196.	851297.
1937	2	223000.	3276.	2500.	147.87	69.69	78.18	213776.	787798.	10000.	0.	45.80	21854.	809653.
1937	3	229000.	1591.	2800.	148.34	69.75	78.59	217791.	892329.	10000.	0.	45.80	24196.	916525.
1937	4	205000.	16060.	3100.	149.01	69.68	79.33	207960.	829691.	10000.	0.	45.80	23415.	853107.
1937	5	224000.	10489.	3200.	149.10	70.51	78.59	221289.	906789.	10000.	0.	39.00	19685.	926474.
1937	6	219000.	3527.	3300.	149.60	69.17	80.43	209227.	843923.	10000.	0.	39.00	19050.	862973.
1937	7	247000.	1158.	3300.	149.36	69.35	80.01	234858.	974716.	10000.	0.	39.00	19685.	994401.
1937	8	250000.	2090.	3300.	149.40	69.40	80.00	238790.	990542.	10000.	0.	39.00	19685.	1010227.
1937	9	239000.	1241.	3200.	149.49	69.02	80.47	227041.	916333.	10000.	0.	39.00	19050.	935383.
1937	10	221000.	1339.	3200.	149.66	68.69	80.97	209139.	876418.	10000.	0.	39.00	19685.	896102.
1937	11	227000.	2714.	3200.	149.29	69.50	79.79	216514.	868257.	10000.	0.	45.80	23415.	891673.
1937	12	218000.	1430.	2900.	149.15	69.38	79.77	206530.	854967.	10000.	0.	45.80	24196.	879163.
1938	1	210000.	1838.	2500.	147.59	68.95	78.63	199338.	814892.	10000.	0.	45.80	24196.	839088.
1938	2	217000.	3421.	2500.	148.00	69.23	78.77	207921.	770030.	10000.	0.	45.80	21854.	791884.
1938	3	234000.	17207.	2800.	148.06	70.83	77.22	238407.	964837.	10000.	0.	45.80	24196.	989033.
1938	4	244000.	9428.	3100.	148.51	71.37	77.13	240328.	940366.	10000.	0.	45.80	23415.	963782.
1938	5	238000.	4203.	3200.	148.99	70.72	78.27	229003.	935739.	10000.	0.	39.00	19685.	955424.
1938	6	217000.	1257.	3300.	149.70	69.07	80.63	204957.	828030.	10000.	0.	39.00	19050.	847080.
1938	7	221000.	821.	3300.	149.77	68.64	81.13	208521.	875275.	10000.	0.	39.00	19685.	894960.
1938	8	223000.	612.	3300.	149.80	68.64	81.16	210312.	883105.	10000.	0.	39.00	19685.	902790.
1938	9	237000.	1013.	3200.	149.52	69.07	80.45	224813.	907247.	10000.	0.	39.00	19050.	926297.
1938	10	255000.	860.	3200.	149.24	69.60	79.64	242660.	1002757.	10000.	0.	39.00	19685.	1022442.
1938	11	235000.	982.	3200.	149.19	68.99	80.20	222782.	896973.	10000.	0.	45.80	23415.	920388.
1938	12	213000.	2007.	2900.	149.25	68.83	80.42	202107.	841670.	10000.	0.	45.80	24196.	865866.
1939	1	210000.	1500.	2500.	147.60	68.74	78.86	199000.	815271.	10000.	0.	45.80	24196.	839467.
1939	2	207000.	1056.	2500.	148.35	68.68	79.67	195556.	729006.	10000.	0.	45.80	21854.	750860.
1939	3	208000.	3205.	2800.	148.81	68.86	79.95	198405.	821732.	10000.	0.	45.80	24196.	845928.
1939	4	226000.	29232.	3100.	148.49	70.11	78.39	242132.	957643.	10000.	0.	45.80	23415.	981058.
1939	5	246000.	4973.	3200.	148.89	71.25	77.65	237773.	965849.	10000.	0.	39.00	19685.	985534.
1939	6	233000.	2423.	3300.	149.35	69.83	79.52	222123.	888591.	10000.	0.	39.00	19050.	907641.
1939	7	220000.	1162.	3300.	149.79	68.99	80.80	207862.	869479.	10000.	0.	39.00	19685.	889164.
1939	8	220000.	762.	3300.	149.86	68.84	81.02	207462.	869743.	10000.	0.	39.00	19685.	889427.
1939	9	222000.	640.	3200.	149.78	68.64	81.14	209440.	850898.	10000.	0.	39.00	19050.	869947.
1939	10	222000.	860.	3200.	149.65	68.64	81.01	209660.	878982.	10000.	0.	39.00	19685.	898667.
1939	11	212000.	1634.	3200.	149.63	68.56	81.06	200434.	812896.	10000.	0.	45.80	23415.	836311.
1939	12	210000.	2239.	2900.	149.32	68.80	80.52	199339.	830615.	10000.	0.	45.80	24196.	854811.

81-06-15-10:51

PLAN DE REGULATION DU SAINT-LAURENT BASE 1977 AVEC DEV.

AN	MOIS	* APPORTS CORNWALL	APPORTS ST-FRANC.	* PERTES * CHENEAUX	BEAUHARNOIS AMONT	AVAL	CHUTE	TURBINE	* ENERGIE	LES CEDRES TURBINE	DEVERSE	CHUTE	* ENERGIE	TOTAL ENERGIE
1940	1	210000.	868.	2500.	147.61	68.61	79.00	198368.	813715.	10000.	0.	45.80	24196.	837911.
1940	2	207000.	632.	2500.	148.36	68.46	79.90	195132.	755103.	10000.	0.	45.80	22635.	777737.
1940	3	204000.	1001.	2800.	149.00	68.40	80.60	192201.	800340.	10000.	0.	45.80	24196.	824536.
1940	4	188000.	21886.	3100.	149.31	68.97	80.34	196786.	791646.	10000.	0.	45.80	23415.	815061.
1940	5	200000.	4093.	3200.	149.84	69.32	80.52	190893.	793932.	10000.	0.	39.00	19685.	813617.
1940	6	241000.	3001.	3300.	149.23	70.44	78.80	230701.	916574.	10000.	0.	39.00	19050.	935624.
1940	7	251000.	2530.	3300.	149.32	70.01	79.31	240230.	990122.	10000.	0.	39.00	19685.	1009807.
1940	8	251000.	1033.	3300.	149.40	69.45	79.95	238733.	989858.	10000.	0.	39.00	19685.	1009543.
1940	9	229000.	785.	3200.	149.64	68.84	80.80	216585.	877159.	10000.	0.	39.00	19050.	896209.
1940	10	229000.	821.	3200.	149.51	68.79	80.72	216621.	905840.	10000.	0.	39.00	19685.	925525.
1940	11	218000.	1897.	3200.	149.48	68.64	80.84	206697.	836998.	10000.	0.	45.80	23415.	860413.
1940	12	218000.	4875.	2900.	149.08	69.17	79.91	209975.	870794.	10000.	0.	45.80	24196.	894990.
1941	1	220000.	3394.	2500.	147.28	69.35	77.93	210894.	858130.	10000.	0.	45.80	24196.	882326.
1941	2	232000.	2066.	2500.	147.71	69.57	78.15	221566.	816748.	10000.	0.	45.80	21854.	838602.
1941	3	220000.	2321.	2800.	148.52	69.08	79.44	209521.	864871.	10000.	0.	45.80	24196.	889067.
1941	4	194000.	15470.	3100.	149.32	69.40	79.92	196370.	786501.	10000.	0.	45.80	23415.	809916.
1941	5	192000.	1555.	3200.	150.21	68.74	81.47	180355.	755469.	10000.	0.	39.00	19685.	775153.
1941	6	204000.	1033.	3300.	150.07	68.34	81.73	191733.	781960.	10000.	0.	39.00	19050.	801010.
1941	7	210000.	498.	3300.	150.06	68.39	81.68	197198.	831362.	10000.	0.	39.00	19685.	851047.
1941	8	214000.	424.	3300.	150.02	68.44	81.58	201124.	847500.	10000.	0.	39.00	19685.	867185.
1941	9	216000.	416.	3200.	149.93	68.49	81.44	203216.	827677.	10000.	0.	39.00	19050.	846727.
1941	10	208000.	546.	3200.	150.00	68.59	81.41	195346.	820958.	10000.	0.	39.00	19685.	840643.
1941	11	204000.	1072.	3200.	149.86	68.89	80.97	191872.	776138.	10000.	0.	45.80	23415.	799553.
1941	12	210000.	1021.	2900.	149.35	69.17	80.19	198121.	822486.	10000.	0.	45.80	24196.	846682.
1942	1	210000.	1272.	2500.	147.60	69.04	78.56	198772.	811859.	10000.	0.	45.80	24196.	836054.
1942	2	207000.	954.	2500.	148.35	68.92	79.43	195454.	726796.	10000.	0.	45.80	21854.	748651.
1942	3	209000.	17663.	2800.	148.42	69.60	78.82	213863.	877909.	10000.	0.	45.80	24196.	902105.
1942	4	235000.	17069.	3100.	148.52	70.59	77.93	238969.	941619.	10000.	0.	45.80	23415.	965035.
1942	5	238000.	1932.	3200.	149.02	70.18	78.83	226732.	931251.	10000.	0.	39.00	19685.	950936.
1942	6	252000.	1241.	3300.	149.15	70.11	79.04	239941.	954727.	10000.	0.	39.00	19050.	973777.
1942	7	236000.	447.	3300.	149.50	69.04	80.46	223147.	930676.	10000.	0.	39.00	19685.	950360.
1942	8	252000.	514.	3300.	149.40	69.35	80.05	239214.	992684.	10000.	0.	39.00	19685.	1012369.
1942	9	250000.	483.	3200.	149.39	69.27	80.12	237283.	953695.	10000.	0.	39.00	19050.	972745.
1942	10	245000.	711.	3200.	149.31	69.17	80.13	232511.	966271.	10000.	0.	39.00	19685.	985956.
1942	11	244000.	1139.	3200.	149.09	69.30	79.79	231939.	929876.	10000.	0.	45.80	23415.	953291.
1942	12	240000.	891.	2900.	148.81	69.63	79.18	227991.	939366.	10000.	0.	45.80	24196.	963562.
1943	1	220000.	1426.	2500.	147.33	69.17	78.16	208926.	851746.	10000.	0.	45.80	24196.	875942.
1943	2	248000.	6273.	2500.	147.52	70.09	77.43	235000.	860723.	16773.	0.	44.62	34966.	895689.
1943	3	254000.	16814.	2800.	148.04	70.80	77.24	240000.	971327.	28014.	0.	42.67	60969.	1032296.
1943	4	260000.	8949.	3100.	148.46	70.89	77.56	255849.	1002821.	10000.	0.	45.80	23415.	1026237.
1943	5	277000.	12893.	3200.	148.84	72.92	75.92	276693.	1100920.	10000.	0.	39.00	19685.	1120604.
1943	6	298000.	3315.	3300.	149.12	71.88	77.24	288000.	1116863.	10015.	0.	39.00	19078.	1135941.
1943	7	304000.	2247.	3300.	149.30	71.10	78.20	288000.	1163021.	14947.	0.	39.00	29412.	1192433.
1943	8	310000.	1433.	3300.	149.38	70.89	78.49	288000.	1165701.	20133.	0.	39.00	39608.	1205309.
1943	9	299000.	950.	3200.	149.37	70.64	78.73	286750.	1125837.	10000.	0.	39.00	19050.	1144886.
1943	10	271000.	1650.	3200.	149.25	69.96	79.29	259450.	1065664.	10000.	0.	39.00	19685.	1085348.
1943	11	270000.	4533.	3200.	149.04	70.11	78.93	261333.	1035125.	10000.	0.	45.80	23415.	1058540.
1943	12	244000.	2451.	2900.	148.75	69.81	78.94	233551.	959942.	10000.	0.	45.80	24196.	984137.

81-06-15-10:51

PLAN DE REGULATION DU SAINT-LAURENT BASE 1977 AVEC DEV.

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1944	1	210000.	1701.	2500.	147.59	68.77	78.82	199201.	815834.	10000.	0.	45.80	24196.	840030.
1944	2	216000.	1815.	2500.	148.07	68.74	79.33	205315.	791538.	10000.	0.	45.80	22635.	814172.
1944	3	217000.	15353.	2800.	148.31	69.20	79.11	219553.	904039.	10000.	0.	45.80	24196.	928234.
1944	4	222000.	13781.	3100.	148.71	69.27	79.44	222681.	890165.	10000.	0.	45.80	23415.	913581.
1944	5	240000.	4478.	3200.	148.96	70.01	78.95	231278.	950822.	10000.	0.	39.00	19685.	970507.
1944	6	252000.	1650.	3300.	149.15	69.50	79.65	240350.	961527.	10000.	0.	39.00	19050.	980577.
1944	7	266000.	852.	3300.	149.28	69.68	79.61	253552.	1045567.	10000.	0.	39.00	19685.	1065251.
1944	8	261000.	518.	3300.	149.37	69.50	79.87	248218.	1026925.	10000.	0.	39.00	19685.	1046610.
1944	9	254000.	589.	3200.	149.37	69.37	79.99	241389.	968588.	10000.	0.	39.00	19050.	987637.
1944	10	241000.	978.	3200.	149.34	69.10	80.25	228778.	952027.	10000.	0.	39.00	19685.	971712.
1944	11	222000.	1622.	3200.	149.40	68.66	80.74	210422.	851443.	10000.	0.	45.80	23415.	874858.
1944	12	214000.	1127.	2900.	149.25	68.80	80.45	202227.	842424.	10000.	0.	45.80	24196.	866620.
1945	1	210000.	1496.	2500.	147.60	68.83	78.77	198996.	814505.	10000.	0.	45.80	24196.	838701.
1945	2	207000.	1638.	2500.	148.33	68.58	79.75	196138.	731836.	10000.	0.	45.80	21854.	753690.
1945	3	221000.	23453.	2800.	148.12	70.28	77.85	231653.	942935.	10000.	0.	45.80	24196.	967131.
1945	4	256000.	11314.	3100.	148.46	70.92	77.54	254214.	996470.	10000.	0.	45.80	23415.	1019885.
1945	5	271000.	14850.	3200.	148.84	71.20	77.64	272650.	1101007.	10000.	0.	39.00	19685.	1120691.
1945	6	284000.	3138.	3300.	149.12	71.10	78.02	273838.	1073128.	10000.	0.	39.00	19050.	1092177.
1945	7	291000.	1426.	3300.	149.30	70.51	78.79	279126.	1135722.	10000.	0.	39.00	19685.	1155406.
1945	8	290000.	561.	3300.	149.38	70.29	79.10	277261.	1131672.	10000.	0.	39.00	19685.	1151356.
1945	9	275000.	950.	3200.	149.37	69.98	79.38	262750.	1044437.	10000.	0.	39.00	19050.	1063487.
1945	10	292000.	5429.	3200.	149.25	70.77	78.49	284229.	1151818.	10000.	0.	39.00	19685.	1171502.
1945	11	290000.	5798.	3200.	149.04	70.72	78.32	282598.	1107378.	10000.	0.	45.80	23415.	1130793.
1945	12	272000.	1873.	2900.	148.73	70.71	78.02	260973.	1060045.	10000.	0.	45.80	24196.	1084240.
1946	1	220000.	4466.	2500.	147.25	69.32	77.93	211966.	862665.	10000.	0.	45.80	24196.	886861.
1946	2	252000.	2349.	2500.	147.52	70.25	77.28	235000.	859566.	16849.	0.	44.61	35108.	894675.
1946	3	258000.	13310.	2800.	148.04	71.35	76.69	240000.	966729.	28510.	0.	42.58	61898.	1028628.
1946	4	260000.	4879.	3100.	148.46	70.46	78.00	251779.	991150.	10000.	0.	45.80	23415.	1014565.
1946	5	232000.	5951.	3200.	149.04	69.50	79.54	224751.	929267.	10000.	0.	39.00	19685.	948952.
1946	6	230000.	1225.	3300.	149.42	69.35	80.07	217925.	876359.	10000.	0.	39.00	19050.	895409.
1946	7	239000.	459.	3300.	149.46	68.99	80.46	226159.	943197.	10000.	0.	39.00	19685.	962882.
1946	8	245000.	459.	3300.	149.46	69.10	80.36	232159.	966902.	10000.	0.	39.00	19685.	986587.
1946	9	244000.	322.	3200.	149.44	69.12	80.32	231122.	931255.	10000.	0.	39.00	19050.	950304.
1946	10	242000.	2730.	3200.	149.31	69.25	80.07	231530.	961672.	10000.	0.	39.00	19685.	981357.
1946	11	249000.	6014.	3200.	149.03	69.68	79.35	241814.	964610.	10000.	0.	45.80	23415.	988026.
1946	12	222000.	4922.	2900.	149.00	69.66	79.34	214022.	882973.	10000.	0.	45.80	24196.	907169.
1947	1	218000.	3508.	2500.	147.32	69.60	77.73	209008.	848603.	10000.	0.	45.80	24196.	872799.
1947	2	246000.	4219.	2500.	147.52	70.55	76.97	235000.	857270.	12719.	0.	45.33	27208.	884478.
1947	3	241000.	7024.	2800.	148.09	70.25	77.84	235224.	957255.	10000.	0.	45.80	24196.	981451.
1947	4	258000.	17615.	3100.	148.47	71.88	76.58	262515.	1019408.	10000.	0.	45.80	23415.	1042823.
1947	5	278000.	15769.	3200.	148.84	73.45	75.39	280569.	1110628.	10000.	0.	39.00	19685.	1130312.
1947	6	300000.	13192.	3300.	149.12	73.68	75.44	288000.	1101380.	21892.	0.	39.00	41677.	1143057.
1947	7	304000.	7920.	3300.	149.30	71.68	77.62	288000.	1157605.	20620.	0.	39.00	40566.	1198170.
1947	8	310000.	1512.	3300.	149.38	71.02	78.36	288000.	1164507.	20212.	0.	39.00	39764.	1204270.
1947	9	307000.	2533.	3200.	149.37	70.77	78.60	288000.	1129112.	18333.	0.	39.00	34906.	1164018.
1947	10	280000.	1323.	3200.	149.25	70.06	79.20	268123.	1098070.	10000.	0.	39.00	19685.	1117754.
1947	11	262000.	3135.	3200.	149.01	69.68	79.34	251935.	1003299.	10000.	0.	45.80	23415.	1026714.
1947	12	234000.	4140.	2900.	148.84	69.45	79.39	225240.	929956.	10000.	0.	45.80	24196.	954152.

81-06-15-10:51

PLAN DE REGULATION DU SAINT-LAURENT BASE 1977 AVEC DEV.

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1948	1	215000.	1245.	2500.	147.46	68.86	78.60	203745.	833427.	10000.	0.	45.80	24196.	857623.
1948	2	224000.	2412.	2500.	147.86	69.17	78.70	213912.	820485.	10000.	0.	45.80	22635.	843120.
1948	3	235000.	11962.	2800.	148.10	70.37	77.73	234162.	952041.	10000.	0.	45.80	24196.	976237.
1948	4	266000.	6057.	3100.	148.46	70.84	77.62	258957.	1014901.	10000.	0.	45.80	23415.	1038316.
1948	5	278000.	5095.	3200.	148.84	70.79	78.05	269895.	1094281.	10000.	0.	39.00	19685.	1113965.
1948	6	282000.	1237.	3300.	149.12	70.41	78.71	269937.	1064951.	10000.	0.	39.00	19050.	1084000.
1948	7	272000.	734.	3300.	149.30	69.86	79.44	259434.	1066978.	10000.	0.	39.00	19685.	1086662.
1948	8	264000.	671.	3300.	149.36	69.60	79.76	251371.	1038421.	10000.	0.	39.00	19685.	1058105.
1948	9	256000.	267.	3200.	149.36	69.30	80.06	243067.	975696.	10000.	0.	39.00	19050.	994745.
1948	10	240000.	475.	3200.	149.36	68.94	80.42	227275.	947367.	10000.	0.	39.00	19685.	967052.
1948	11	229000.	1595.	3200.	149.27	68.74	80.53	217395.	878127.	10000.	0.	45.80	23415.	901543.
1948	12	216000.	1496.	2900.	149.20	68.83	80.37	204596.	851827.	10000.	0.	45.80	24196.	876023.
1949	1	214000.	7472.	2500.	147.33	69.17	78.16	208972.	851930.	10000.	0.	45.80	24196.	876126.
1949	2	233000.	5299.	2500.	147.64	69.72	77.92	225799.	830750.	10000.	0.	45.80	21854.	852604.
1949	3	244000.	11424.	2800.	148.04	70.43	77.61	240000.	974436.	12624.	0.	45.35	29918.	1004354.
1949	4	248000.	10143.	3100.	148.48	71.02	77.46	245043.	961086.	10000.	0.	45.80	23415.	984501.
1949	5	240000.	2561.	3200.	148.98	70.18	78.80	229361.	941691.	10000.	0.	39.00	19685.	961376.
1949	6	221000.	1103.	3300.	149.61	68.92	80.69	208803.	844400.	10000.	0.	39.00	19050.	863450.
1949	7	220000.	644.	3300.	149.80	68.79	81.01	207344.	869157.	10000.	0.	39.00	19685.	888841.
1949	8	222000.	385.	3300.	149.83	68.56	81.26	209085.	878801.	10000.	0.	39.00	19685.	898486.
1949	9	223000.	1056.	3200.	149.75	68.59	81.16	210856.	856897.	10000.	0.	39.00	19050.	875947.
1949	10	222000.	1261.	3200.	149.64	68.61	81.02	210061.	880835.	10000.	0.	39.00	19685.	900520.
1949	11	214000.	2647.	3200.	149.55	68.44	81.12	203447.	825888.	10000.	0.	45.80	23415.	849304.
1949	12	210000.	4675.	2900.	149.26	68.92	80.34	201775.	839523.	10000.	0.	45.80	24196.	863719.
1950	1	212000.	6914.	2500.	147.39	69.26	78.13	206414.	840921.	10000.	0.	45.80	24196.	865117.
1950	2	238000.	1433.	2500.	147.63	69.72	77.90	226933.	834802.	10000.	0.	45.80	21854.	856656.
1950	3	242000.	5892.	2800.	148.09	70.06	78.03	235092.	958300.	10000.	0.	45.80	24196.	982495.
1950	4	269000.	17050.	3100.	148.47	71.07	77.40	272950.	1064416.	10000.	0.	45.80	23415.	1087831.
1950	5	276000.	2412.	3200.	148.84	70.94	77.90	265212.	1075144.	10000.	0.	39.00	19685.	1094828.
1950	6	266000.	1249.	3300.	149.11	70.29	78.82	253949.	1006435.	10000.	0.	39.00	19050.	1025484.
1950	7	257000.	624.	3300.	149.30	69.80	79.50	244324.	1008102.	10000.	0.	39.00	19685.	1027786.
1950	8	254000.	832.	3300.	149.39	69.58	79.81	241532.	999809.	10000.	0.	39.00	19685.	1019494.
1950	9	257000.	1166.	3200.	149.35	69.68	79.67	244966.	979624.	10000.	0.	39.00	19050.	998674.
1950	10	249000.	970.	3200.	149.27	69.45	79.82	236770.	980743.	10000.	0.	39.00	19685.	1000428.
1950	11	251000.	5382.	3200.	149.02	69.75	79.27	243182.	969196.	10000.	0.	45.80	23415.	992612.
1950	12	254000.	5303.	2900.	148.70	70.40	78.30	246403.	1005725.	10000.	0.	45.80	24196.	1029920.
1951	1	220000.	7700.	2500.	147.18	69.54	77.65	215200.	873825.	10000.	0.	45.80	24196.	898021.
1951	2	256000	4046.	2500.	147.52	70.55	76.97	235000.	857270.	22546.	0.	43.62	45548.	902819.
1951	3	272000.	18385.	2800.	148.04	71.69	76.35	240000.	963959.	47585.	0.	39.26	94254.	1058212.
1951	4	286000.	15989.	3100.	148.47	73.22	75.24	288000.	1099719.	10889.	0.	45.65	25305.	1125024.
1951	5	299000.	8632.	3200.	148.84	71.91	76.94	288000.	1151333.	10432.	0.	39.00	20534.	1171867.
1951	6	308000.	2773.	3300.	149.12	71.02	78.10	288000.	1124560.	19473.	0.	39.00	37075.	1161635.
1951	7	302000.	4085.	3300.	149.30	70.94	78.36	288000.	1164448.	14785.	0.	39.00	29094.	1193541.
1951	8	287000.	1473.	3300.	149.38	70.23	79.15	275173.	1124312.	10000.	0.	39.00	19685.	1143996.
1951	9	278000.	1064.	3200.	149.37	70.06	79.31	265864.	1055324.	10000.	0.	39.00	19050.	1074373.
1951	10	262000.	887.	3200.	149.23	69.91	79.32	249687.	1027772.	10000.	0.	39.00	19685.	1047456.
1951	11	255000.	2840.	3200.	149.02	70.46	78.55	244640.	968695.	10000.	0.	45.80	23415.	992111.
1951	12	250000.	1779.	2900.	148.72	70.49	78.23	238879.	975226.	10000.	0.	45.80	24196.	999422.

81-06-15-10:51

PLAN DE REGULATION DU SAINT-LAURENT BASE 1977 AVEC DEV.

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1952	1	220000.	4478.	2500.	147.25	69.51	77.75	211978.	861221.	10000.	0.	45.80	24196.	885417.
1952	2	260000.	4439.	2500.	147.52	70.71	76.82	235000.	886706.	26939.	0.	42.85	55137.	941843.
1952	3	279000.	12610.	2800.	148.04	71.42	76.63	240000.	966224.	48810.	0.	39.05	96107.	1062330.
1952	4	295000.	14182.	3100.	148.47	72.11	76.36	288000.	1109165.	18082.	0.	44.40	40085.	1149250.
1952	5	304000.	3850.	3200.	148.84	72.06	76.78	288000.	1149961.	16650.	0.	39.00	32761.	1182721.
1952	6	308000.	2435.	3300.	149.12	71.55	77.57	288000.	1119785.	19135.	0.	39.00	36432.	1156216.
1952	7	305000.	2742.	3300.	149.30	70.89	78.41	288000.	1164925.	16442.	0.	39.00	32352.	1197276.
1952	8	293000.	821.	3300.	149.38	70.56	78.82	280521.	1141212.	10000.	0.	39.00	19685.	1160896.
1952	9	284000.	785.	3200.	149.37	70.21	79.16	271585.	1075029.	10000.	0.	39.00	19050.	1094078.
1952	10	270000.	3225.	3200.	149.25	70.01	79.25	260025.	1067449.	10000.	0.	39.00	19685.	1087133.
1952	11	244000.	2427.	3200.	149.08	69.30	79.78	233227.	934850.	10000.	0.	45.80	23415.	958265.
1952	12	242000.	5853.	2900.	148.74	70.00	78.75	234953.	963914.	10000.	0.	45.80	24196.	988109.
1953	1	220000.	4635.	2500.	147.25	69.29	77.96	212135.	863590.	10000.	0.	45.80	24196.	887786.
1953	2	247000.	5264.	2500.	147.52	70.21	77.31	235000.	859797.	14764.	0.	44.97	31155.	890952.
1953	3	250000.	11471.	2800.	148.04	71.02	77.03	240000.	969530.	18671.	0.	44.29	42631.	1012160.
1953	4	263000.	12767.	3100.	148.47	71.27	77.19	262667.	1025047.	10000.	0.	45.80	23415.	1048462.
1953	5	264000.	8328.	3200.	148.84	70.56	78.28	259128.	1055185.	10000.	0.	39.00	19685.	1074869.
1953	6	278000.	1744.	3300.	149.12	70.16	78.96	266444.	1054352.	10000.	0.	39.00	19050.	1073401.
1953	7	270000.	1343.	3300.	149.29	69.78	79.51	258043.	1062238.	10000.	0.	39.00	19685.	1081922.
1953	8	270000.	848.	3300.	149.37	69.75	79.62	257548.	1061285.	10000.	0.	39.00	19685.	1080969.
1953	9	262000.	671.	3200.	149.34	69.50	79.84	249471.	998406.	10000.	0.	39.00	19050.	1017456.
1953	10	249000.	1331.	3200.	149.27	69.22	80.05	237131.	984233.	10000.	0.	39.00	19685.	1003917.
1953	11	226000.	1186.	3200.	149.33	68.66	80.67	213986.	865431.	10000.	0.	45.80	23415.	888847.
1953	12	221000.	2223.	2900.	149.07	68.92	80.15	210323.	874326.	10000.	0.	45.80	24196.	898521.
1954	1	210000.	1343.	2500.	147.60	68.71	78.89	198843.	814886.	10000.	0.	45.80	24196.	839082.
1954	2	221000.	6442.	2500.	147.84	69.29	78.55	214942.	794988.	10000.	0.	45.80	21854.	816842.
1954	3	250000.	19210.	2800.	148.04	70.77	77.27	240000.	971585.	26410.	0.	42.95	57933.	1029518.
1954	4	262000.	20153.	3100.	148.47	71.43	77.04	269053.	1047204.	10000.	0.	45.80	23415.	1070618.
1954	5	284000.	8800.	3200.	148.84	71.15	77.70	279600.	1127392.	10000.	0.	39.00	19685.	1147076.
1954	6	284000.	4989.	3300.	149.12	70.82	78.30	275689.	1082308.	10000.	0.	39.00	19050.	1101357.
1954	7	272000.	1932.	3300.	149.30	70.08	79.22	260632.	1069533.	10000.	0.	39.00	19685.	1089217.
1954	8	255000.	1261.	3300.	149.38	69.50	79.88	242961.	1006155.	10000.	0.	39.00	19685.	1025840.
1954	9	256000.	4596.	3200.	149.35	69.63	79.72	247396.	989360.	10000.	0.	39.00	19050.	1008410.
1954	10	258000.	9507.	3200.	149.23	70.36	78.87	254307.	1041817.	10000.	0.	39.00	19685.	1061502.
1954	11	275000.	9467.	3200.	149.04	70.82	78.22	271267.	1065524.	10000.	0.	45.80	23415.	1088939.
1954	12	258000.	7307.	2900.	148.70	70.80	77.90	252407.	1025810.	10000.	0.	45.80	24196.	1050005.
1955	1	220000.	3476.	2500.	147.28	69.78	77.49	210976.	854999.	10000.	0.	45.80	24196.	879195.
1955	2	255000.	2050.	2500.	147.52	70.68	76.85	235000.	856358.	19550.	0.	44.14	40124.	896482.
1955	3	268000.	17089.	2800.	148.04	71.45	76.60	240000.	965970.	42289.	0.	40.18	85932.	1051902.
1955	4	285000.	25103.	3100.	148.47	72.89	75.57	288000.	1102478.	19003.	0.	44.24	41912.	1144390.
1955	5	294000.	2266.	3200.	148.84	71.25	77.59	283066.	1139270.	10000.	0.	39.00	19685.	1158954.
1955	6	280000.	1426.	3300.	149.12	70.31	78.81	268126.	1059200.	10000.	0.	39.00	19050.	1078249.
1955	7	262000.	632.	3300.	149.29	69.65	79.63	249332.	1029212.	10000.	0.	39.00	19685.	1048896.
1955	8	259000.	1025.	3300.	149.37	69.53	79.84	246725.	1020802.	10000.	0.	39.00	19685.	1040486.
1955	9	256000.	1213.	3200.	149.36	69.45	79.91	244013.	977980.	10000.	0.	39.00	19050.	997030.
1955	10	254000.	1202.	3200.	149.24	69.50	79.74	242002.	1001064.	10000.	0.	39.00	19685.	1020749.
1955	11	277000.	1213.	3200.	149.04	70.54	78.50	265013.	1044997.	10000.	0.	45.80	23415.	1068412.
1955	12	247000.	660.	2900.	148.75	70.15	78.59	234760.	961815.	10000.	0.	45.80	24196.	986011.

81-06-15-10:51

PLAN DE REGULATION DU SAINT-LAURENT BASE 1977 AVEC DEV.

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1956	1	210000.	1135.	2500.	147.61	68.92	78.68	198635.	812297.	10000.	0.	45.80	24196.	836493.
1956	2	218000.	974.	2500.	148.04	69.01	79.02	206474.	793751.	10000.	0.	45.80	22635.	816386.
1956	3	233000.	2145.	2800.	148.26	69.63	78.63	222345	911511.	10000.	0.	45.80	24196.	935707.
1956	4	245000.	20625.	3100.	148.46	70.67	77.79	252525.	992249.	10000.	0.	45.80	23415.	1015664.
1956	5	269000.	9192.	3200.	148.84	71.17	77.67	264992.	1072277.	10000.	0.	39.00	19685.	1091961.
1956	6	282000.	2757.	3300.	149.12	70.92	78.20	271457.	1066021.	10000.	0.	39.00	19050.	1085070.
1956	7	278000.	931.	3300.	149.30	70.34	78.96	265631.	1086417.	10000.	0.	39.00	19685.	1106101.
1956	8	268000.	561.	3300.	149.37	70.01	79.36	255261.	1049988.	10000.	0.	39.00	19685.	1069672.
1956	9	268000.	766.	3200.	149.35	70.26	79.09	255566.	1014887.	10000.	0.	39.00	19050.	1033937.
1956	10	254000.	703.	3200.	149.25	70.01	79.24	241503.	994546.	10000.	0.	39.00	19685.	1014231.
1956	11	230000.	809.	3200.	149.27	69.10	80.17	217609.	875944.	10000.	0.	45.80	23415.	899359.
1956	12	214000.	2050.	2900.	149.23	69.11	80.12	203150.	843560.	10000.	0.	45.80	24196.	867755.
1957	1	210000.	2074.	2500.	147.58	69.04	78.53	199574.	815101.	10000.	0.	45.80	24196.	839297.
1957	2	220000.	2671.	2500.	147.95	69.41	78.53	210171.	776816.	10000.	0.	45.80	21854.	798671.
1957	3	226000.	8407.	2800.	148.27	69.94	78.33	221607.	905989.	10000.	0.	45.80	24196.	930185.
1957	4	225000.	4635.	3100.	148.82	69.30	79.53	216535.	866168.	10000.	0.	45.80	23415.	889583.
1957	5	217000.	3795.	3200.	149.38	69.10	80.28	207595.	863866.	10000.	0.	39.00	19685.	883551.
1957	6	220000.	1991.	3300.	149.61	68.89	80.72	208691.	844175.	10000.	0.	39.00	19050.	863225.
1957	7	252000.	1300.	3300.	149.32	70.31	79.01	240000.	986521.	10000.	0.	39.00	19685.	1006206.
1957	8	259000.	773.	3300.	149.37	69.68	79.69	246473.	1018422.	10000.	0.	39.00	19685.	1038107.
1957	9	252000.	762.	3200.	149.38	69.63	79.75	239562.	959358.	10000.	0.	39.00	19050.	978408.
1957	10	233000.	758.	3200.	149.45	69.30	80.15	220558.	917238.	10000.	0.	39.00	19685.	936922.
1957	11	218000.	1284.	3200.	149.49	69.25	80.24	206084.	829482.	10000.	0.	45.80	23415.	852897.
1957	12	214000.	4714.	2900.	149.17	69.78	79.38	205814.	848686.	10000.	0.	45.80	24196.	872882.
1958	1	212000.	1854.	2500.	147.53	69.35	78.17	201354.	819817.	10000.	0.	45.80	24196.	844013.
1958	2	207000.	1712.	2500.	148.33	69.26	79.07	196212.	727076.	10000.	0.	45.80	21854.	748931.
1958	3	204000.	5067.	2800.	148.87	69.48	79.40	196267.	807926.	10000.	0.	45.80	24196.	832122.
1958	4	188000.	26478.	3100.	149.18	69.45	79.73	201378.	805786.	10000.	0.	45.80	23415.	829201.
1958	5	195000.	3889.	3200.	150.02	68.59	81.43	185689.	778788.	10000.	0.	39.00	19685.	798473.
1958	6	212000.	2113.	3300.	149.80	68.84	80.96	200813.	813635.	10000.	0.	39.00	19050.	832685.
1958	7	218000.	1151.	3300.	149.84	68.97	80.87	205851.	861538.	10000.	0.	39.00	19685.	881223.
1958	8	220000.	990.	3300.	149.86	68.82	81.04	207690.	870892.	10000.	0.	39.00	19685.	890577.
1958	9	226000.	1143.	3200.	149.69	68.99	80.70	213943.	865523.	10000.	0.	39.00	19050.	884572.
1958	10	243000.	3865.	3200.	149.30	69.63	79.67	233665.	966801.	10000.	0.	39.00	19685.	986486.
1958	11	236000.	3547.	3200.	149.15	69.58	79.57	226347.	905861.	10000.	0.	45.80	23415.	929276.
1958	12	213000.	1885.	2900.	149.26	69.17	80.09	201985.	838282.	10000.	0.	45.80	24196.	862478.
1959	1	210000.	2557.	2500.	147.56	68.98	78.58	200057.	817549.	10000.	0.	45.80	24196.	841745.
1959	2	207000.	2247.	2500.	148.31	68.89	79.42	196747.	731770.	10000.	0.	45.80	21854.	753624.
1959	3	217000.	8800.	2800.	148.44	69.26	79.18	213000.	877292.	10000.	0.	45.80	24196.	901488.
1959	4	243000.	20978.	3100.	148.46	70.77	77.69	250878.	985196.	10000.	0.	45.80	23415.	1008612.
1959	5	257000.	1948.	3200.	148.85	70.41	78.43	245748.	1004326.	10000.	0.	39.00	19685.	1024010.
1959	6	254000.	2561.	3300.	149.13	69.80	79.33	243261.	970012.	10000.	0.	39.00	19050.	989061.
1959	7	240000.	919.	3300.	149.44	69.30	80.14	227619.	946320.	10000.	0.	39.00	19685.	966005.
1959	8	221000.	656.	3300.	149.84	68.74	81.10	208356.	874269.	10000.	0.	39.00	19685.	893953.
1959	9	221000.	683.	3200.	149.80	68.82	80.99	208483.	845618.	10000.	0.	39.00	19050.	864668.
1959	10	220000.	1225.	3200.	149.68	68.89	80.79	208025.	870108.	10000.	0.	39.00	19685.	889793.
1959	11	216000.	3017.	3200.	149.50	69.27	80.23	205817.	828220.	10000.	0.	45.80	23415.	851635.
1959	12	227000.	7346.	2900.	148.89	70.12	78.76	221446.	908939.	10000.	0.	45.80	24196.	933 [illegible].

81-06-15-10:52

PLAN DE REGULATION DU SAINT-LAURENT BASE 1977 AVEC DEV.

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1960	1	220000.	1803.	2500.	147.32	69.66	77.66	209303.	849292.	10000.	0.	45.80	24196.	873488.
1960	2	242000.	4753.	2500.	147.53	70.52	77.01	234253.	885384.	10000.	0.	45.80	22635.	908019.
1960	3	244000.	2808.	2800.	148.10	70.37	77.73	234008.	951435.	10000.	0.	45.80	24196.	975631.
1960	4	252000.	33118.	3100.	148.47	72.21	76.26	272018.	1051362.	10000.	0.	45.80	23415.	1074777.
1960	5	271000.	3413.	3200.	148.84	72.59	76.25	261213.	1045597.	10000.	0.	39.00	19685.	1065281.
1960	6	287000.	1532.	3300.	149.12	70.97	78.15	275232.	1079303.	10000.	0.	39.00	19050.	1098352.
1960	7	281000.	498.	3300.	149.30	71.05	78.26	268198.	1089714.	10000.	0.	39.00	19685.	1109398.
1960	8	266000.	420.	3300.	149.36	70.23	79.13	253120.	1039518.	10000.	0.	39.00	19685.	1059203.
1960	9	251000.	612.	3200.	149.38	69.58	79.81	238112.	955383.	10000.	0.	39.00	19050.	974432.
1960	10	236000.	1052.	3200.	149.40	69.17	80.23	228352.	931598.	10000.	0.	39.00	19685.	951283.
1960	11	222000.	1555.	3200.	149.40	68.89	80.51	210355.	849248.	10000.	0.	45.80	23415.	872663.
1960	12	214000.	718.	2900.	149.26	69.04	80.22	201818.	838648.	10000.	0.	45.80	24196.	862843.
1961	1	210000.	573.	2500.	147.62	68.83	78.79	198073.	810720.	10000.	0.	45.80	24196.	834966.
1961	2	207000.	1665.	2500.	148.33	68.80	79.53	196165.	730322	10000.	0.	45.80	21854.	752177.
1961	3	204000.	10528.	2800.	148.72	68.71	80.01	201728.	836516.	10000.	0.	45.80	24196.	860712.
1961	4	198000.	15753.	3100.	149.20	69.12	80.08	200653.	805623.	10000.	0.	45.80	23415.	829038.
1961	5	223000.	4635.	3200.	149.23	69.60	79.62	214435.	887091.	10000.	0.	39.00	19685.	906775.
1961	6	258000.	2856.	3300.	149.11	70.18	78.93	247556.	983078.	10000.	0.	39.00	19050.	1002128.
1961	7	256000.	2062.	3300.	149.30	70.03	79.27	244762.	1007781.	10000.	0.	39.00	19685.	1027466.
1961	8	250000.	1155.	3300.	149.41	69.68	79.73	237855.	984322.	10000.	0.	39.00	19685.	1004007.
1961	9	252000.	883.	3200.	149.38	69.70	79.67	239683.	959162.	10000.	0.	39.00	19050.	978212.
1961	10	237000.	758.	3200.	149.39	69.37	80.02	224558.	932639.	10000.	0.	39.00	19685.	952323.
1961	11	235000.	1060.	3200.	149.19	69.22	79.97	222860.	895331.	10000.	0.	45.80	23415.	918747.
1961	12	216000.	3543.	2900.	149.15	69.23	79.92	206643.	856736.	10000.	0.	45.80	24196.	880931.
1962	1	210000.	2097.	2500.	147.58	69.17	78.41	199597.	814204.	10000.	0.	45.80	24196.	838400.
1962	2	207000.	1347.	2500.	148.34	69.14	79.20	195647.	726644.	10000.	0.	45.80	21854.	748499.
1962	3	204000.	9114.	2800.	148.76	69.08	79.68	200314.	827676.	10000.	0.	45.80	24196.	851871.
1962	4	188000.	18189.	3100.	149.42	69.50	79.92	193089.	772737.	10000.	0.	45.80	23415.	796152.
1962	5	195000.	4792.	3200.	149.99	69.20	80.79	186592.	777342.	10000.	0.	39.00	19685.	797026.
1962	6	211000.	986.	3300.	149.86	68.69	81.17	198686.	806520.	10000.	0.	39.00	19050.	825570.
1962	7	214000.	856.	3300.	149.94	68.54	81.41	201556.	847834.	10000.	0.	39.00	19685.	867519.
1962	8	220000.	4557.	3300.	149.78	68.72	81.06	211257.	886261.	10000.	0.	39.00	19685.	905946.
1962	9	220000.	1331.	3200.	149.81	68.64	81.17	208131.	845751.	10000.	0.	39.00	19050.	864800.
1962	10	218000.	4203.	3200.	149.66	68.66	80.99	209003.	876088.	10000.	0.	39.00	19685.	895773.
1962	11	214000.	8800.	3200.	149.42	68.74	80.68	209600.	847567.	10000.	0.	45.80	23415.	870982.
1962	12	214000.	3720.	2900.	149.19	68.86	80.33	204820.	852475.	10000.	0.	45.80	24196.	876671.
1963	1	208000.	1414.	2500.	147.66	68.64	79.01	196914.	807573.	10000.	0.	45.80	24196.	831769.
1963	2	207000.	1414.	2500.	148.34	68.58	79.75	195914.	731013.	10000.	0.	45.80	21854.	752867.
1963	3	198000.	8289.	2800.	148.96	68.46	80.50	193489.	805081.	10000.	0.	45.80	24196.	829277.
1963	4	187000.	22825.	3100.	149.31	69.35	79.96	196725.	788309.	10000.	0.	45.80	23415.	811725.
1963	5	192000.	6757.	3200.	150.02	68.59	81.44	185557.	778244.	10000.	0.	39.00	19685.	797929.
1963	6	206000.	1265.	3300.	150.00	68.44	81.56	193965.	789967.	10000.	0.	39.00	19050.	809017.
1963	7	214000.	750.	3300.	149.95	68.44	81.51	201450.	848296.	10000.	0.	39.00	19685.	867981.
1963	8	219000.	1799.	3300.	149.86	68.54	81.32	207499.	872583.	10000.	0.	39.00	19685.	892268.
1963	9	218000.	2435.	3200.	149.83	68.64	81.19	207235.	842224.	10000.	0.	39.00	19050.	861274.
1963	10	214000.	1151.	3200.	149.82	68.46	81.36	201951.	849131.	10000.	0.	39.00	19685.	868815.
1963	11	205000.	6678.	3200.	149.68	68.49	81.19	198478.	805784.	10000.	0.	45.80	23415.	829199.
1963	12	210000.	4046.	2900.	149.28	69.01	80.26	201146.	836165.	10000.	0.	45.80	24196.	860361.

81-06-15-10:52

PLAN DE REGULATION DU SAINT-LAURENT BASE 1977 AVEC DEV.

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1964	1	210000.	5264.	2500.	147.49	68.95	78.54	202764.	828724.	10000.	0.	45.80	24196.	852920.
1964	2	207000.	2023.	2500.	148.32	68.77	79.55	196523.	758004.	10000.	0.	45.80	22635.	780639.
1964	3	193000.	11825.	2800.	149.01	68.86	80.15	192025.	795740.	10000.	0.	45.80	24196.	819936.
1964	4	177000.	8957.	3100.	150.17	68.49	81.68	172857.	700241.	10000.	0.	45.80	23415.	723656.
1964	5	184000.	2950.	3200.	150.47	68.26	82.22	173750.	732165.	10000.	0.	39.00	19685.	751850.
1964	6	196000.	1166.	3300.	150.33	68.34	82.00	183866.	750592.	10000.	0.	39.00	19050.	769642.
1964	7	201000.	628.	3300.	150.33	68.18	82.15	188328.	796699.	10000.	0.	39.00	19685.	816383.
1964	8	207000.	711.	3300.	150.20	68.23	81.97	194411.	821791.	10000.	0.	39.00	19685.	841476.
1964	9	208000.	648.	3200.	150.13	68.18	81.95	195448.	799498.	10000.	0.	39.00	19050.	818548.
1964	10	206000.	660.	3200.	150.05	68.18	81.87	193460.	816754.	10000.	0.	39.00	19685.	836438.
1964	11	198000.	1453.	3200.	150.04	68.03	82.00	186253.	760881.	10000.	0.	45.80	23415.	784296.
1964	12	192000.	1665.	2900.	149.88	68.18	81.70	180765.	759237.	10000.	0.	45.80	24196.	783433.
1965	1	185000.	1669.	2500.	148.49	68.00	80.49	174169.	719646.	10000.	0.	45.80	24196.	743842.
1965	2	182000.	2628.	2500.	149.22	68.12	81.10	172128.	646179.	10000.	0.	45.80	21854.	668033.
1965	3	179000.	2475.	2800.	149.91	67.97	81.94	168675.	706828.	10000.	0.	45.80	24196.	731023.
1965	4	182000.	5539.	3100.	150.10	68.29	81.82	174439.	708265.	10000.	0.	45.80	23415.	731680.
1965	5	176000.	1893.	3200.	150.87	68.39	82.48	164693.	693243.	10000.	0.	39.00	19685.	712928.
1965	6	190000.	644.	3300.	150.58	67.98	82.60	177344.	727419.	10000.	0.	39.00	19050.	746469.
1965	7	202000.	534.	3300.	150.30	68.11	82.20	189234.	801103.	10000.	0.	39.00	19685.	820787.
1965	8	206000.	1606.	3300.	150.20	68.36	81.84	194306.	820242.	10000.	0.	39.00	19685.	839927.
1965	9	202000.	1987.	3200.	150.27	68.54	81.73	190787.	777924.	10000.	0.	39.00	19050.	796973.
1965	10	204000.	3535.	3200.	150.03	69.35	80.68	194335.	810261.	10000.	0.	39.00	19685.	829945.
1965	11	207000.	9114.	3200.	149.57	69.22	80.34	202914.	817196.	10000.	0.	45.80	23415.	840612.
1965	12	217000.	6325.	2900.	149.07	69.78	79.29	210425.	867387.	10000.	0.	45.80	24196.	891583.
1966	1	219000.	2871.	2500.	147.32	69.69	77.62	209371.	849318.	10000.	0.	45.80	24196.	873514.
1966	2	219000.	3465.	2500.	147.95	69.60	78.35	209965.	774702.	10000.	0.	45.80	21854.	796557.
1966	3	232000.	10725.	2800.	148.15	70.74	77.41	229925.	932282.	10000.	0.	45.80	24196.	956478.
1966	4	230000.	6285.	3100.	148.71	70.16	78.55	223185.	884783.	10000.	0.	45.80	23415.	908198.
1966	5	208000.	3303.	3200.	149.62	69.30	80.33	198103.	823603.	10000.	0.	39.00	19685.	843288.
1966	6	211000.	1567.	3300.	149.85	69.07	80.78	199267.	805628.	10000.	0.	39.00	19050.	824678.
1966	7	216000.	679.	3300.	149.90	68.64	81.26	203379.	854372.	10000.	0.	39.00	19685.	874057.
1966	8	218000.	726.	3300.	149.91	68.77	81.14	205426.	862134.	10000.	0.	39.00	19685.	881819.
1966	9	220000.	840.	3200.	149.82	68.69	81.13	207640.	843385.	10000.	0.	39.00	19050.	862434.
1966	10	214000.	856.	3200.	149.83	68.59	81.24	201656.	846812.	10000.	0.	39.00	19685.	866496.
1966	11	208000.	1316.	3200.	149.74	68.77	80.97	196116.	794072.	10000.	0.	45.80	23415.	817487.
1966	12	211000.	2054.	2900.	149.30	70.18	79.12	200154.	822328.	10000.	0.	45.80	24196.	846524.
1967	1	210000.	2021.	2500.	147.58	69.35	78.23	199521.	812420.	10000.	0.	45.80	24196.	836615.
1967	2	221000.	1901.	2500.	147.94	69.91	78.04	210401.	774018.	10000.	0.	45.80	21854.	795872.
1967	3	206000.	5872.	2800.	148.79	68.98	79.81	199072.	823409.	10000.	0.	45.80	24196.	847604.
1967	4	211000.	18776.	3100.	148.82	70.41	78.41	216676.	857619.	10000.	0.	45.80	23415.	881034.
1967	5	216000.	4434.	3200.	149.38	70.13	79.25	207234.	853591.	10000.	0.	39.00	19685.	873276.
1967	6	218000.	2085.	3300.	149.65	69.65	80.00	206785.	830349.	10000.	0.	39.00	19050.	849399.
1967	7	234000.	1773.	3300.	149.51	69.55	79.96	222473.	923492.	10000.	0.	39.00	19685.	943176.
1967	8	248000.	1394.	3300.	149.42	69.45	79.97	236094.	979377.	10000.	0.	39.00	19685.	999061.
1967	9	246000.	1334.	3200.	149.41	69.42	79.99	234134.	940239.	10000.	0.	39.00	19050.	959289.
1967	10	256000.	3088.	3200.	149.23	70.06	79.17	245888.	1011424.	10000.	0.	39.00	19685.	1031109.
1967	11	271000.	5153.	3200.	149.04	71.25	77.79	262953.	1031215.	10000.	0.	45.80	23415.	1054630.
1967	12	274000.	6392.	2900.	148.73	71.63	77.10	267492.	1076735.	10000.	0.	45.80	24196.	1100930.

81-06-15-10:52

PLAN DE REGULATION DU SAINT-LAURENT BASE 1977 AVEC DEV.

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1968	1	244000.	2381.	2500.	146.93	70.52	76.40	230000.	924417.	13881.	0.	45.13	32615.	957032.
1968	2	248000.	3333.	2500.	147.52	70.55	76.97	235000.	887887.	13833.	0.	45.13	30415.	918303.
1968	3	234000.	14340.	2800.	148.08	70.55	77.53	235540.	955909.	10000.	0.	45.80	24196.	980105.
1968	4	254000.	6960.	3100.	148.47	70.97	77.50	247860.	972136.	10000.	0.	45.80	23415.	995551.
1968	5	232000.	3211.	3200.	149.09	69.48	79.61	222011.	918546.	10000.	0.	39.00	19685.	938231.
1968	6	228000.	1174.	3300.	149.46	69.15	80.31	215874.	870093.	10000.	0.	39.00	19050.	889143.
1968	7	248000.	2353.	3300.	149.34	69.70	79.64	237053.	980254.	10000.	0.	39.00	19685.	999939.
1968	8	257000.	1216.	3300.	149.37	69.75	79.62	244916.	1011586.	10000.	0.	39.00	19685.	1031271.
1968	9	265000.	1094.	3200.	149.35	69.91	79.44	252894.	1007861.	10000.	0.	39.00	19050.	1026911.
1968	10	256000.	1496.	3200.	149.23	69.65	79.58	244296.	1008777.	10000.	0.	39.00	19685.	1028462.
1968	11	250000.	6289.	3200.	149.02	69.65	79.37	243089.	969717.	10000.	0.	45.80	23415.	993132.
1968	12	253000.	5702.	2900.	148.70	70.40	78.30	245802.	1003358.	10000.	0.	45.80	24196.	1027553.
1969	1	232000.	4074.	2500.	147.02	69.81	77.21	223574.	904810.	10000.	0.	45.80	24196.	929006.
1969	2	251000.	5592.	2500.	147.52	70.40	77.12	235000.	858416.	19092.	0.	44.22	39282.	897698.
1969	3	249000.	9227.	2800.	148.04	70.31	77.74	240000.	975480.	15427.	0.	44.86	35893.	1011373.
1969	4	259000.	23008.	3100.	148.47	71.45	77.02	268908.	1046459.	10000.	0.	45.80	23415.	1069874.
1969	5	270000.	5432.	3200.	148.84	71.48	77.37	262232.	1059069.	10000.	0.	39.00	19685.	1078753.
1969	6	284000.	4314.	3300.	149.12	71.02	78.10	275014.	1078064.	10000.	0.	39.00	19050.	1097113.
1969	7	293000.	1793.	3300.	149.30	70.82	78.48	281493.	1141675.	10000.	0.	39.00	19685.	1161359.
1969	8	290000.	1146.	3300.	149.38	70.69	78.69	277846.	1130057.	10000.	0.	39.00	19685.	1149741.
1969	9	273000.	1082.	3200.	149.37	70.11	79.26	260882.	1036333.	10000.	0.	39.00	19050.	1055382.
1969	10	251000.	1681.	3200.	149.25	69.60	79.65	239481.	990152.	10000.	0.	39.00	19685.	1009837.
1969	11	242000.	5632.	3200.	149.07	69.86	79.21	234432.	934728.	10000.	0.	45.80	23415.	958144.
1969	12	237000.	2556.	2900.	148.82	70.15	78.67	226656.	929532.	10000.	0.	45.80	24196.	953728.
1970	1	223000.	1378.	2500.	147.26	69.66	77.60	211878.	859586.	10000.	0.	45.80	24196.	883782.
1970	2	229000.	2572.	2500.	147.76	69.75	78.01	219072.	806414.	10000.	0.	45.80	21854.	828268.
1970	3	228000.	9387.	2800.	148.22	69.81	78.41	224587.	918863.	10000.	0.	45.80	24196.	943059.
1970	4	232000.	25566.	3100.	148.48	70.44	78.04	244466.	963734.	10000.	0.	45.80	23415.	987150.
1970	5	242000.	5233.	3200.	148.93	70.69	78.24	234033.	955844.	10000.	0.	39.00	19685.	975529.
1970	6	242000.	1693.	3300.	149.24	70.06	79.18	230393.	918575.	10000.	0.	39.00	19050.	937625.
1970	7	253000.	2093.	3300.	149.31	70.18	79.13	241793.	994719.	10000.	0.	39.00	19685.	1014404.
1970	8	262000.	1158.	3300.	149.36	70.16	79.20	249858.	1027396.	10000.	0.	39.00	19685.	1047081.
1970	9	258000.	1893.	3200.	149.35	69.80	79.54	246693.	985116.	10000.	0.	39.00	19050.	1004165.
1970	10	260000.	2796.	3200.	149.23	69.96	79.27	249596.	1026956.	10000.	0.	39.00	19685.	1046640.
1970	11	264000.	3547.	3200.	149.02	70.21	78.81	254347.	1007823.	10000.	0.	45.80	23415.	1031238.
1970	12	254000.	2516.	2900.	148.70	70.58	78.12	243616.	993138.	10000.	0.	45.80	24196.	1017333.
1971	1	234000.	2463.	2500.	147.02	70.09	76.92	223963.	904112.	10000.	0.	45.80	24196.	928308.
1971	2	245000.	2286.	2500.	147.53	70.40	77.13	234786.	857658.	10000.	0.	45.80	21854.	879512.
1971	3	260000.	4871.	2800.	148.04	71.02	77.03	240000.	969530.	22071.	0.	43.70	49487.	1019017.
1971	4	268000.	32135.	3100.	148.47	72.06	76.41	267035.	1106211.	10000.	0.	45.80	23415.	1129626.
1971	5	284000.	9939.	3200.	148.84	72.13	76.71	280739.	1122718.	10000.	0.	39.00	19685.	1142402.
1971	6	272000.	1606.	3300.	149.12	70.41	78.71	260306.	1029314.	10000.	0.	39.00	19050.	1048364.
1971	7	262000.	940.	3300.	149.29	69.83	79.46	249640.	1028810.	10000.	0.	39.00	19685.	1048494.
1971	8	257000.	1096.	3300.	149.37	69.65	79.72	244796.	1012031.	10000.	0.	39.00	19685.	1031715.
1971	9	265000.	1602.	3200.	149.35	69.88	79.47	253402.	1010018.	10000.	0.	39.00	19050.	1029068.
1971	10	262000.	935.	3200.	149.23	69.78	79.45	249735.	1029109.	10000.	0.	39.00	19685.	1048793.
1971	11	257000.	1060.	3200.	149.02	69.63	79.39	244860.	976719.	10000.	0.	45.80	23415.	1000134.
1971	12	243000.	4007.	2900.	148.75	70.03	78.72	234107.	960284.	10000.	0.	45.80	24196.	984480.

81-06-15-10:52

PLAN DE REGULATION DU SAINT-LAURENT BASE 1977 AVEC DEV.

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1972	1	221000.	3406.	2500.	147.26	69.29	77.96	211906.	862675.	10000.	0.	45.80	24196.	886871.
1972	2	228000.	2003.	2500.	147.79	69.60	78.19	217503.	830557.	10000.	0.	45.80	22635.	853192.
1972	3	251000.	3626.	2800.	148.04	70.37	77.67	240000.	974957.	11826.	0.	45.48	28191.	1003148.
1972	4	270000.	31468.	3100.	148.47	71.78	76.69	288000.	1112015.	10368.	0.	45.74	24199.	1136214.
1972	5	288000.	9939.	3200.	148.84	72.79	76.05	284739.	1131563.	10000.	0.	39.00	19685.	1151247.
1972	6	301000.	7150.	3300.	149.12	71.70	77.42	288000.	1118433.	16850.	0.	39.00	32084.	1150517.
1972	7	311000.	6521.	3300.	149.30	71.88	77.42	288000.	1155741.	26221.	0.	39.00	51577.	1207317.
1972	8	310000.	7071.	3300.	149.38	71.60	77.78	288000.	1159067.	25771.	0.	39.00	50692.	1209759.
1972	9	308000.	1378.	3200.	149.37	71.27	78.09	288000.	1124500.	18178.	0.	39.00	34611.	1159111.
1972	10	301000.	2824.	3200.	149.25	71.25	78.00	288000.	1161157.	12624.	0.	39.00	24845.	1186001.
1972	11	289000.	9075.	3200.	149.04	71.43	77.62	284875.	1109147.	10000.	0.	45.80	23415.	1132562.
1972	12	270000.	5735.	2900.	148.73	71.48	77.25	262835.	1060390.	10000.	0.	45.80	24196.	1084585.
1973	1	250000.	10546.	2500.	146.93	71.11	75.82	230000.	919784.	28046.	0.	42.66	61029.	980813.
1973	2	284000.	6751.	2500.	147.52	72.06	75.46	235000.	846334.	50000.	3251.	38.28	87027.	933361.
1973	3	298000.	23083.	2800.	148.04	73.76	74.29	240000.	947711.	50000.	28283.	33.92	85761.	1033472.
1973	4	324000.	12423.	3100.	148.47	73.07	75.39	288000.	1100989.	45323.	0.	39.66	87834.	1188822.
1973	5	337000.	8229.	3200.	148.84	73.00	75.85	288000.	1141629.	54029.	0.	39.00	106227.	1247856.
1973	6	350000.	8948.	3300.	149.12	72.69	76.43	288000.	1109786.	60000.	7648.	39.00	114153.	1223939.
1973	7	350000.	1953.	3300.	149.30	72.26	77.04	288000.	1152275.	60000.	653.	39.00	117958.	1270233.
1973	8	324000.	1941.	3300.	149.38	71.45	77.93	288000.	1160478.	34641.	0.	39.00	68128.	1228605.
1973	9	310000.	1861.	3200.	149.37	71.02	78.35	288000.	1126798.	20661.	0.	39.00	39335.	1166133.
1973	10	294000.	2676.	3200.	149.25	70.79	78.46	283476.	1148803.	10000.	0.	39.00	19685.	1168487.
1973	11	282000.	3890.	3200.	149.04	70.61	78.43	272690.	1072510.	10000.	0.	45.80	23415.	1095925.
1973	12	264000.	6990.	2900.	148.72	71.14	77.58	258090.	1045058.	10000.	0.	45.80	24196.	1069253.
1974	1	239000.	9800.	2500.	146.93	70.40	76.53	230000.	925403.	16300.	0.	44.71	37725.	963129.
1974	2	268000.	6990.	2500.	147.52	71.20	76.32	235000.	852519.	37490.	0.	41.02	70408.	922927.
1974	3	296000.	11270.	2800.	148.04	72.59	75.46	240000.	956792.	50000.	14470.	36.33	91347.	1048139.
1974	4	308000.	17210.	3100.	148.47	72.82	75.65	288000.	1103118.	34110.	0.	41.61	69756.	1172873.
1974	5	308000.	11070.	3200.	148.84	73.91	74.94	288000.	1133738.	27870.	0.	39.00	54818.	1188556.
1974	6	328000.	4100.	3300.	149.12	73.05	76.07	288000.	1106741.	40800.	0.	39.00	77644.	1184385.
1974	7	336000.	2480.	3300.	149.30	72.08	77.22	288000.	1153888.	47180.	0.	39.00	92770.	1246657.
1974	8	330000.	2980.	3300.	149.38	71.45	77.93	288000.	1160478.	41680.	0.	39.00	81962.	1242439.
1974	9	310000.	3050.	3200.	149.37	70.87	78.50	288000.	1128185.	21850.	0.	39.00	41597.	1169782.
1974	10	288000.	3620.	3200.	149.25	70.46	78.79	278420.	1133119.	10000.	0.	39.00	19685.	1152803.
1974	11	275000.	13400.	3200.	149.04	70.67	78.38	275200.	1081185.	10000.	0.	45.80	23415.	1104600.
1974	12	278000.	11170.	2900.	148.73	71.63	77.10	276270.	1109660.	10000.	0.	45.80	24196.	1133855.
1975	1	246000.	10810.	2500.	146.93	70.62	76.31	230000.	923680.	24310.	0.	43.31	53888.	977568.
1975	2	250000.	7225.	2500.	147.52	70.62	76.91	235000.	656814.	19725.	0.	44.11	40445.	897259.
1975	3	279000.	10680.	2800.	148.04	71.82	76.23	240000.	962958.	46880.	0.	39.39	93176.	1056133.
1975	4	302000.	14280.	3100.	148.47	72.34	76.13	288000.	1107208.	25180.	0.	43.16	53781.	1160988.
1975	5	304000.	4250.	3200.	148.84	72.08	76.76	288000.	1149733.	17050.	0.	39.00	33547.	1183280.
1975	6	308000.	1130.	3300.	149.12	71.60	77.52	288000.	1119333.	17830.	0.	39.00	33949.	1153281.
1975	7	287000.	3680.	3300.	149.30	70.56	78.74	277380.	1128730.	10000.	0.	39.00	19685.	1148414.
1975	8	282000.	2740.	3300.	149.38	70.23	79.15	271440.	1110226.	10000.	0.	39.00	19685.	1129910.
1975	9	285000.	5210.	3200.	149.37	70.41	78.95	277010.	1092958.	10000.	0.	39.00	19050.	1112007.
1975	10	293000.	9730.	3200.	149.25	70.74	78.51	288000.	1165911.	11530.	0.	39.00	22693.	1188604.
1975	11	287000.	12670.	3200.	149.04	70.82	78.22	286470.	1120257.	10000.	0.	45.80	23415.	1143672.
1975	12	264000.	12240.	2900.	148.73	71.32	77.41	263340.	1063664.	10000.	0.	45.80	24196.	1087859.

81-06-15-10:52

PLAN DE REGULATION DU SAINT-LAURENT BASE 1977 AVEC DEV.

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1976	1	244000.	6200.	2500.	146.93	70.95	75.97	230000.	920995.	17700.	0.	44.46	40634.	961629.
1976	2	259000.	12840.	2500.	147.52	71.39	76.14	235000.	881578.	34340.	0.	41.57	67810.	949389.
1976	3	289000.	19310.	2800.	148.04	73.02	75.03	240000.	953406.	50000.	15510.	36.14	90904.	1044310.
1976	4	306000.	13210.	3100.	148.47	74.01	74.46	288000.	1093247.	28110.	0.	42.65	59177.	1152423.
1976	5	328000.	11460.	3200.	148.84	73.43	75.42	288000.	1137876.	48260.	0.	39.00	94892.	1232768.
1976	6	348000.	2850.	3300.	149.12	72.51	76.61	288000.	1111321.	59550.	0.	39.00	113298.	1224618.
1976	7	350000.	5520.	3300.	149.30	72.24	77.06	288000.	1152505.	60000.	4220.	39.00	117958.	1270463.
1976	8	326000.	9910.	3300.	149.38	71.48	77.91	288000.	1160242.	44610.	0.	39.00	87720.	1247961.
1976	9	309000.	10770.	3200.	149.37	71.05	78.32	288000.	1126567.	28570.	0.	39.00	54382.	1180948.
1976	10	302000.	9920.	3200.	149.25	71.10	78.16	288000.	1162577.	20720.	0.	39.00	40762.	1203339.
1976	11	287000.	9240.	3200.	149.04	70.67	78.38	283040.	1109415.	10000.	0.	45.80	23415.	1132830.
1976	12	233000.	5150.	2900.	148.84	70.28	78.56	225250.	922868.	10000.	0.	45.80	24196.	947064.

81-06-15-10:52

PLAN DE REGULATION DU SAINT-LAURENT BASE 1977 AVEC DEV.

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
****	1	216416.	3183.	2500.	147.41	69.18	78.23	206446.	841552.	10652.	0.	45.69	25558.	867110.
****	2	227987.	2970.	2500.	147.91	69.44	78.47	215162.	801685.	13253.	42.	45.23	28083.	829768.
****	3	233207.	10583.	2800.	148.33	69.94	78.38	223226.	911826.	17008.	757.	44.45	37450.	949276.
****	4	240052.	16130.	3100.	148.72	70.69	78.03	241525.	948337.	11556.	0.	45.53	26438.	974775.
****	5	247156.	5642.	3200.	149.17	70.92	78.25	237982.	966718.	11617.	0.	39.00	22863.	989582.
****	6	252428.	2616.	3300.	149.39	70.31	79.09	239303.	948196.	12341.	99.	39.00	23503.	971700.
****	7	256272.	1637.	3300.	149.50	69.87	79.63	242136.	996705.	12410.	63.	39.00	24422.	1021127.
****	8	257649.	1440.	3300.	149.54	69.64	79.90	243878.	1006580.	11911.	0.	39.00	23441.	1030021.
****	9	254922.	1394.	3200.	149.50	69.51	79.99	242368.	969672.	10748.	0.	39.00	20473.	990146.
****	10	247701.	2286.	3200.	149.41	69.45	79.96	236594.	978769.	10193.	0.	39.00	20064.	998834.
****	11	240207.	3784.	3200.	149.25	69.46	79.79	230792.	922783.	10000.	0.	45.80	23415.	946197.
****	12	230818.	3461.	2900.	149.00	69.66	79.34	221379.	911827.	10000.	0.	45.80	24195.	936023.
*********		242068.	4594.	3042.	148.93	69.84	79.09	231732.	933720.	11807.	80.	42.21	24992.	958713.

MOYENNE MENSUELLE ET ANNUELLE DES 77 ANNEES ETUDIEES

81-06-15-10:52

PLAN DE REGULATION DU SAINT-LAURENT ERIE 25 CAT1

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1900	1	216000.	4147.	2500.	147.36	69.11	78.25	207647.	847115.	10000.	0.	45.80	24196.	871311.
1900	2	233000.	6048.	2500.	147.63	69.63	78.00	226548.	863912.	10000.	0.	45.80	22635.	886547.
1900	3	242000.	13527.	2800.	148.04	69.63	78.41	240000.	981291.	12727.	0.	45.33	30140.	1011431.
1900	4	251000.	10058.	3100.	148.47	70.97	77.50	247958.	972505.	10000.	0.	45.80	23415.	995920.
1900	5	258000.	4543.	3200.	148.84	71.32	77.51	249343.	1010469.	10000.	0.	39.00	19685.	1030153.
1900	6	246000.	2040.	3300.	149.19	70.34	78.85	234740.	932908.	10000.	0.	39.00	19050.	951957.
1900	7	243000.	1407.	3300.	149.40	70.08	79.31	231107.	953289.	10000.	0.	39.00	19685.	972974.
1900	8	250000.	1335.	3300.	149.41	69.98	79.43	238035.	982323.	10000.	0.	39.00	19685.	1002008.
1900	9	254000.	1217.	3200.	149.36	69.65	79.71	242017.	968554.	10000.	0.	39.00	19050.	987604.
1900	10	246000.	1747.	3200.	149.29	69.58	79.71	234547.	970764.	10000.	0.	39.00	19685.	990449.
1900	11	237000.	4782.	3200.	149.12	69.70	79.42	228582.	913442.	10000.	0.	45.80	23415.	936858.
1900	12	249000.	3387.	2900.	148.72	70.21	78.50	239487.	980026.	10000.	0.	45.80	24196.	1004222.
1901	1	219000.	1789.	2500.	147.34	69.11	78.24	208289.	849691.	10000.	0.	45.80	24196.	873887.
1901	2	222000.	1446.	2500.	147.93	68.80	79.13	210946.	784244.	10000.	0.	45.80	21854.	806098.
1901	3	206000.	12813.	2800.	148.60	68.52	80.08	206013.	855431.	10000.	0.	45.80	24196.	879627.
1901	4	232000.	17663.	3100.	148.54	71.12	77.42	236563.	928134.	10000.	0.	45.80	23415.	951549.
1901	5	248000.	5465.	3200.	148.88	71.58	77.30	240265.	972857.	10000.	0.	39.00	19685.	992541.
1901	6	255000.	2414.	3300.	149.13	70.89	78.23	244114.	963968.	10000.	0.	39.00	19050.	983017.
1901	7	259000.	1309.	3300.	149.29	69.88	79.41	247009.	1017999.	10000.	0.	39.00	19685.	1037684.
1901	8	250000.	1381.	3300.	149.41	69.35	80.06	238081.	988186.	10000.	0.	39.00	19685.	1007871.
1901	9	252000.	1424.	3200.	149.37	69.45	79.92	240224.	963448.	10000.	0.	39.00	19050.	982498.
1901	10	236000.	2638.	3200.	149.38	69.04	80.34	225438.	939091.	10000.	0.	39.00	19685.	958776.
1901	11	217000.	2473.	3200.	149.49	68.64	80.85	206273.	835327.	10000.	0.	45.80	23415.	858742.
1901	12	211000.	3728.	2900.	149.26	68.98	80.28	201828.	839214.	10000.	0.	45.80	24196.	863410.
1902	1	210000.	2848.	2500.	147.56	68.80	78.76	200348.	820221.	10000.	0.	45.80	24196.	844417.
1902	2	207000.	1974.	2500.	148.32	68.37	79.95	196474.	734692.	10000.	0.	45.80	21854.	756547.
1902	3	209000.	21143.	2800.	148.35	70.00	78.35	217343.	888491.	10000.	0.	45.80	24196.	912687.
1902	4	218000.	12959.	3100.	148.80	70.36	78.44	217859.	862599.	10000.	0.	45.80	23415.	886014.
1902	5	206000.	6190.	3200.	149.60	70.16	79.44	198990.	819996.	10000.	0.	39.00	19685.	839680.
1902	6	211000.	2696.	3300.	149.82	69.96	79.86	200396.	802775.	10000.	0.	39.00	19050.	821825.
1902	7	244000.	1828.	3300.	149.38	70.11	79.27	232528.	958714.	10000.	0.	39.00	19685.	978399.
1902	8	288000.	1209.	3300.	149.38	70.61	78.77	275909.	1123518.	10000.	0.	39.00	19685.	1143202.
1902	9	284000.	1132.	3200.	149.37	70.13	79.23	271932.	1076989.	10000.	0.	39.00	19050.	1096038.
1902	10	270000.	1659.	3200.	149.25	69.91	79.34	258459.	1062246.	10000.	0.	39.00	19685.	1081930.
1902	11	254000.	2763.	3200.	149.02	69.86	79.16	243563.	969780.	10000.	0.	45.80	23415.	993196.
1902	12	241000.	2992.	2900.	148.78	70.18	78.59	231092.	946963.	10000.	0.	45.80	24196.	971159.
1903	1	217000.	2414.	2500.	147.38	69.08	78.30	206914.	844422.	10000.	0.	45.80	24196.	868618.
1903	2	234000.	4432.	2500.	147.64	69.60	78.04	225932.	832153.	10000.	0.	45.80	21854.	854007.
1903	3	258000.	19156.	2800.	148.04	71.73	76.29	240000.	963457.	34356.	0.	41.56	72515.	1035973.
1903	4	278000.	9859.	3100.	148.47	71.73	76.74	274759.	1065313.	10000.	0.	45.80	23415.	1088728.
1903	5	282000.	787.	3200.	148.84	71.48	77.37	269587.	1086995.	10000.	0.	39.00	19685.	1106679.
1903	6	270000.	1253.	3300.	149.11	70.74	78.37	257953.	1017594.	10000.	0.	39.00	19050.	1036644.
1903	7	269000.	958.	3300.	149.29	70.49	78.80	256658.	1050349.	10000.	0.	39.00	19685.	1070033.
1903	8	278000.	900.	3300.	149.38	70.31	79.07	265600.	1087290.	10000.	0.	39.00	19685.	1106974.
1903	9	285000.	676.	3200.	149.37	70.08	79.28	272476.	1079440.	10000.	0.	39.00	19050.	1098489.
1903	10	273000.	1045.	3200.	149.25	70.11	79.14	260845.	1069687.	10000.	0.	39.00	19685.	1089371.
1903	11	253000.	659.	3200.	149.03	69.40	79.63	240459.	961825.	10000.	0.	45.80	23415.	985240.
1903	12	218000.	523.	2900.	149.17	68.55	80.62	205623.	858409.	10000.	0.	45.80	24196.	882604.

81-06-15-10:52

PLAN DE REGULATION DU SAINT-LAURENT ERIE 25 CAT1

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1904	1	210000.	981.	2500.	147.61	68.46	79.15	198481.	815431.	10000.	0.	45.80	24196.	839627.
1904	2	219000.	1642.	2500.	148.00	68.71	79.29	208142.	802434.	10000.	0.	45.80	22635.	825068.
1904	3	235000.	11724.	2800.	148.10	69.72	78.38	233924.	956586.	10000.	0.	45.80	24196.	980782.
1904	4	271000.	16601.	3100.	148.47	71.86	76.61	274501.	1063309.	10000.	0.	45.80	23415.	1086724.
1904	5	287000.	7910.	3200.	148.84	73.25	75.59	281710.	1116542.	10000.	0.	39.00	19685.	1136226.
1904	6	294000.	2937.	3300.	149.12	73.00	76.12	283637.	1091812.	10000.	0.	39.00	19050.	1110861.
1904	7	297000.	1636.	3300.	149.30	71.32	77.98	285336.	1151135.	10000.	0.	39.00	19685.	1170819.
1904	8	306000.	1244.	3300.	149.38	71.02	78.36	288000.	1164507.	15944.	0.	39.00	31372.	1195879.
1904	9	300000.	1730.	3200.	149.37	70.77	78.60	288000.	1129112.	10530.	0.	39.00	20058.	1149170.
1904	10	284000.	3485.	3200.	149.25	70.84	78.41	274285.	1114110.	10000.	0.	39.00	19685.	1133794.
1904	11	254000.	2265.	3200.	149.02	69.83	79.19	243065.	968092.	10000.	0.	45.80	23415.	991507.
1904	12	213000.	928.	2900.	149.28	68.80	80.48	201028.	837525.	10000.	0.	45.80	24196.	861721.
1905	1	210000.	1258.	2500.	147.60	68.61	78.99	198758.	815294.	10000.	0.	45.80	24196.	839490.
1905	2	210000.	1498.	2500.	148.24	68.34	79.91	198998.	744186.	10000.	0.	45.80	21854.	766041.
1905	3	204000.	9222.	2800.	148.75	68.37	80.39	200422.	834097.	10000.	0.	45.80	24196.	858293.
1905	4	222000.	14965.	3100.	148.70	69.86	78.84	223865.	889893.	10000.	0.	45.80	23415.	913308.
1905	5	231000.	3726.	3200.	149.10	70.31	78.78	221526.	909444.	10000.	0.	39.00	19685.	929129.
1905	6	251000.	1762.	3300.	149.15	70.36	78.79	239462.	950745.	10000.	0.	39.00	19050.	969794.
1905	7	276000.	1075.	3300.	149.30	70.39	78.91	263775.	1078843.	10000.	0.	39.00	19685.	1098527.
1905	8	290000.	915.	3300.	149.38	70.46	78.92	277615.	1131328.	10000.	0.	39.00	19685.	1151012.
1905	9	291000.	952.	3200.	149.37	70.41	78.95	278752.	1099262.	10000.	0.	39.00	19050.	1118311.
1905	10	274000.	1741.	3200.	149.25	70.01	79.25	262541.	1077158.	10000.	0.	39.00	19685.	1096842.
1905	11	253000.	2556.	3200.	149.02	69.60	79.42	242356.	967346.	10000.	0.	45.80	23415.	990761.
1905	12	233000.	2403.	2900.	148.87	69.35	79.52	222503.	919774.	10000.	0.	45.80	24196.	943970.
1906	1	220000.	2886.	2500.	147.29	69.20	78.09	210386.	857344.	10000.	0.	45.80	24196.	881540.
1906	2	251000.	2299.	2500.	147.52	70.03	77.49	235000.	861187.	15799.	0.	44.79	33126.	894314.
1906	3	247000.	8922.	2800.	148.04	69.75	78.29	240000.	980225.	13122.	0.	45.26	30990.	1011216.
1906	4	236000.	14699.	3100.	148.53	69.80	78.72	237599.	942949.	10000.	0.	45.80	23415.	966364.
1906	5	228000.	3648.	3200.	149.15	70.39	78.76	218448.	896512.	10000.	0.	39.00	19685.	916197.
1906	6	233000.	1951.	3300.	149.36	70.41	78.95	221651.	881927.	10000.	0.	39.00	19050.	900976.
1906	7	251000.	1397.	3300.	149.33	69.78	79.55	239097.	987673.	10000.	0.	39.00	19685.	1007358.
1906	8	264000.	771.	3300.	149.36	69.60	79.76	251471.	1038815.	10000.	0.	39.00	19685.	1058499.
1906	9	255000.	801.	3200.	149.36	69.22	80.14	242601.	974579.	10000.	0.	39.00	19050.	993629.
1906	10	237000.	1719.	3200.	149.38	68.79	80.59	225519.	941685.	10000.	0.	39.00	19685.	961370.
1906	11	240000.	1237.	3200.	149.13	68.94	80.18	228037.	917825.	10000.	0.	45.80	23415.	941241.
1906	12	230000.	2238.	2900.	148.92	69.11	79.81	219338.	909179.	10000.	0.	45.80	24196.	933375.
1907	1	220000.	2719.	2500.	147.30	69.11	78.19	210219.	857426.	10000.	0.	45.80	24196.	881621.
1907	2	250000.	1947.	2500.	147.52	69.57	77.96	235000.	864695.	14447.	0.	45.03	30548.	895243.
1907	3	242000.	10545.	2800.	148.04	69.54	78.51	239745.	981090.	10000.	0.	45.80	24196.	1005286.
1907	4	246000.	15996.	3100.	148.46	70.18	78.28	248896.	982629.	10000.	0.	45.80	23415.	1006044.
1907	5	240000.	3768.	3200.	148.97	70.87	78.10	230568.	940651.	10000.	0.	39.00	19685.	960336.
1907	6	247000.	1955.	3300.	149.18	70.69	78.49	235655.	933439.	10000.	0.	39.00	19050.	952489.
1907	7	264000.	1199.	3300.	149.28	70.39	78.90	251899.	1032645.	10000.	0.	39.00	19685.	1052330.
1907	8	282000.	784.	3300.	149.38	70.21	79.17	269484.	1103042.	10000.	0.	39.00	19685.	1122726.
1907	9	282000.	912.	3200.	149.37	70.13	79.23	269712.	1068842.	10000.	0.	39.00	19050.	1087891.
1907	10	280000.	1924.	3200.	149.25	70.36	78.89	268724.	1097538.	10000.	0.	39.00	19685.	1117222.
1907	11	278000.	3263.	3200.	149.04	70.56	78.48	268063.	1056020.	10000.	0.	45.80	23415.	1079435.
1907	12	256000.	3814.	2900.	148.70	70.52	78.17	246914.	1006662.	10000.	0.	45.80	24196.	1030857.

81-06-15-10:52

PLAN DE REGULATION DU SAINT-LAURENT ERIE 25 CAT1

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1908	1	220000.	2386.	2500.	147.30	69.20	78.10	209886.	855343.	10000.	0.	45.80	24196.	879538.
1908	2	255000.	4609.	2500.	147.52	70.09	77.43	235000.	891463.	22109.	0.	43.70	46365.	937828.
1908	3	260000.	17779.	2800.	148.04	70.46	77.58	240000.	974175.	34979.	0.	41.46	73610.	1047785.
1908	4	274000.	10476.	3100.	148.47	71.32	77.14	271376.	1056525.	10000.	0.	45.80	23415.	1079940.
1908	5	286000.	8095.	3200.	148.84	73.75	75.09	280895.	1109236.	10000.	0.	39.00	19685.	1128920.
1908	6	296000.	2615.	3300.	149.12	72.44	76.68	285315.	1102519.	10000.	0.	39.00	19050.	1121568.
1908	7	302000.	1283.	3300.	149.30	71.20	78.10	288000.	1162073.	11983.	0.	39.00	23584.	1185657.
1908	8	305000.	1045.	3300.	149.38	70.72	78.67	288000.	1167379.	14745.	0.	39.00	29015.	1196393.
1908	9	278000.	801.	3200.	149.37	69.86	79.51	265601.	1056178.	10000.	0.	39.00	19050.	1075227.
1908	10	250000.	467.	3200.	149.27	69.07	80.20	237267.	986150.	10000.	0.	39.00	19685.	1005835.
1908	11	217000.	296.	3200.	149.54	68.31	81.23	204096.	829531.	10000.	0.	45.80	23415.	852946.
1908	12	210000.	101.	2900.	149.38	68.37	81.01	197201.	825559.	10000.	0.	45.80	24196.	849755.
1909	1	210000.	3914.	2500.	147.53	68.49	79.04	201414.	827043.	10000.	0.	45.80	24196.	851239.
1909	2	207000.	4816.	2500.	148.23	68.46	79.77	199316.	744419.	10000.	0.	45.80	21854.	766273.
1909	3	204000.	15078.	2800.	148.60	68.37	80.23	206278.	857822.	10000.	0.	45.80	24196.	882018.
1909	4	202000.	11783.	3100.	149.20	69.96	79.24	200683.	798982.	10000.	0.	45.80	23415.	822397.
1909	5	250000.	8696.	3200.	148.85	72.89	75.95	245496.	982390.	10000.	0.	39.00	19685.	1002074.
1909	6	265000.	2857.	3300.	149.11	71.91	77.20	254557.	994943.	10000.	0.	39.00	19050.	1013992.
1909	7	265000.	1477.	3300.	149.28	70.31	78.97	253177.	1038335.	10000.	0.	39.00	19685.	1058020.
1909	8	266000.	965.	3300.	149.36	70.16	79.21	253665.	1042345.	10000.	0.	39.00	19685.	1062029.
1909	9	253000.	1175.	3200.	149.37	69.60	79.77	240975.	965001.	10000.	0.	39.00	19050.	984051.
1909	10	236000.	1379.	3200.	149.40	69.10	80.30	224179.	933586.	10000.	0.	39.00	19685.	953271.
1909	11	221000.	2745.	3200.	149.40	68.72	80.68	210545.	851496.	10000.	0.	45.80	23415.	874911.
1909	12	216000.	1568.	2900.	149.19	68.92	80.27	204668.	851327.	10000.	0.	45.80	24196.	875523.
1910	1	210000.	2324.	2500.	147.57	68.77	78.80	199824.	818354.	10000.	0.	45.80	24196.	842550.
1910	2	222000.	3249.	2500.	147.89	68.92	78.97	212749.	789843.	10000.	0.	45.80	21854.	811698.
1910	3	237000.	10045.	2800.	148.10	70.03	78.07	234245.	955226.	10000.	0.	45.80	24196.	979422.
1910	4	246000.	14994.	3100.	148.47	70.79	77.68	247894.	973735.	10000.	0.	45.80	23415.	997151.
1910	5	257000.	6148.	3200.	148.83	70.89	77.94	249948.	1016548.	10000.	0.	39.00	19685.	1036233.
1910	6	252000.	2491.	3300.	149.14	70.31	78.83	241191.	957770.	10000.	0.	39.00	19050.	976820.
1910	7	230000.	1456.	3300.	149.58	68.94	80.64	218156.	911522.	10000.	0.	39.00	19685.	931206.
1910	8	230000.	1280.	3300.	149.65	68.74	80.91	217980.	913214.	10000.	0.	39.00	19685.	932899.
1910	9	238000.	1315.	3200.	149.50	69.07	80.43	226115.	912301.	10000.	0.	39.00	19050.	931351.
1910	10	243000.	2813.	3200.	149.30	69.27	80.03	232613.	965770.	10000.	0.	39.00	19685.	985454.
1910	11	233000.	2737.	3200.	149.20	69.15	80.05	222537.	894722.	10000.	0.	45.80	23415.	918137.
1910	12	216000.	929.	2900.	149.21	68.80	80.41	204029.	849780.	10000.	0.	45.80	24196.	873976.
1911	1	210000.	1282.	2500.	147.60	68.58	79.02	198782.	815643.	10000.	0.	45.80	24196.	839838.
1911	2	207000.	1578.	2500.	148.33	68.31	80.03	196078.	733703.	10000.	0.	45.80	21854.	755557.
1911	3	204000.	5492.	2800.	148.86	68.12	80.74	196692.	821030.	10000.	0.	45.80	24196.	845226.
1911	4	188000.	15527.	3100.	149.51	68.84	80.67	190427.	767538.	10000.	0.	45.80	23415.	790954.
1911	5	194000.	3443.	3200.	150.07	70.03	80.04	184243.	760735.	10000.	0.	39.00	19685.	780420.
1911	6	211000.	1779.	3300.	149.84	69.50	80.34	199479.	802896.	10000.	0.	39.00	19050.	821945.
1911	7	219000.	1208.	3300.	149.81	68.79	81.02	206908.	867386.	10000.	0.	39.00	19685.	887071.
1911	8	222000.	949.	3300.	149.81	68.54	81.27	209649.	881317.	10000.	0.	39.00	19685.	901001.
1911	9	223000.	1159.	3200.	149.75	68.44	81.31	210959.	858613.	10000.	0.	39.00	19050.	877663.
1911	10	218000.	1738.	3200.	149.71	68.34	81.38	206538.	868972.	10000.	0.	39.00	19685.	888657.
1911	11	218000.	2393.	3200.	149.47	68.39	81.08	207193.	841107.	10000.	0.	45.80	23415.	864522.
1911	12	225000.	3873.	2900.	148.97	69.32	79.65	215973.	893745.	10000.	0.	45.80	24196.	917940.

81-06-15-10:52

PLAN DE REGULATION DU SAINT-LAURENT ERIE 25 CAT1

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1912	1	220000.	1934.	2500.	147.31	69.17	78.15	209434.	853781.	10000.	0.	45.80	24196.	877977.
1912	2	234000.	1850.	2500.	147.68	69.17	78.52	223350.	855678.	10000.	0.	45.80	22635.	878313.
1912	3	235000.	5169.	2800.	148.18	69.14	79.04	227369.	935679.	10000.	0.	45.80	24196.	959875.
1912	4	250000.	18341.	3100.	148.46	70.82	77.64	255241.	1001179.	10000.	0.	45.80	23415.	1024594.
1912	5	268000.	9384.	3200.	148.84	71.86	76.99	264184.	1063200.	10000.	0.	39.00	19685.	1082884.
1912	6	281000.	3156.	3300.	149.12	72.16	76.96	270856.	1053090.	10000.	0.	39.00	19050.	1072139.
1912	7	297000.	1614.	3300.	149.30	71.07	78.23	285314.	1153412.	10000.	0.	39.00	19685.	1173096.
1912	8	294000.	1057.	3300.	149.38	70.56	78.82	281757.	1145802.	10000.	0.	39.00	19685.	1165486.
1912	9	283000.	1527.	3200.	149.37	70.26	79.11	271327.	1073626.	10000.	0.	39.00	19050.	1092675.
1912	10	279000.	3212.	3200.	149.25	70.18	79.07	269012.	1100277.	10000.	0.	39.00	19685.	1119961.
1912	11	277000.	5268.	3200.	149.04	71.12	77.92	269068.	1054820.	10000.	0.	45.80	23415.	1078235.
1912	12	256000.	4809.	2900.	148.70	70.86	77.84	247909.	1007634.	10000.	0.	45.80	24196.	1031830.
1913	1	220000.	5811.	2500.	147.22	69.94	77.29	213311.	863090.	10000.	0.	45.80	24196.	887286.
1913	2	258000.	3726.	2500.	147.52	70.62	76.91	235000.	856814.	24226.	0.	43.33	48525.	905339.
1913	3	270000.	20803.	2800.	148.04	71.60	76.44	240000.	964711.	48003.	0.	39.19	94889.	1059600.
1913	4	288000.	11544.	3100.	148.47	72.29	76.18	286444.	1102176.	10000.	0.	45.80	23415.	1125591.
1913	5	295000.	6008.	3200.	148.84	72.21	76.63	287808.	1147897.	10000.	0.	39.00	19685.	1167581.
1913	6	299000.	2241.	3300.	149.12	71.25	77.87	287941.	1122296.	10000.	0.	39.00	19050.	1141345.
1913	7	288000.	1119.	3300.	149.30	70.34	78.96	275819.	1125016.	10000.	0.	39.00	19685.	1144700.
1913	8	280000.	832.	3300.	149.38	69.88	79.50	267532.	1098684.	10000.	0.	39.00	19685.	1118368.
1913	9	272000.	1033.	3200.	149.37	69.73	79.64	259833.	1035799.	10000.	0.	39.00	19050.	1054848.
1913	10	259000.	2922.	3200.	149.23	69.50	79.73	248722.	1027650.	10000.	0.	39.00	19685.	1047335.
1913	11	256000.	3900.	3200.	149.01	70.01	79.01	246700.	980461.	10000.	0.	45.80	23415.	1003877.
1913	12	240000.	2533.	2900.	148.79	70.12	78.67	229633.	941677.	10000.	0.	45.80	24196.	965873.
1914	1	215000.	2834.	2500.	147.42	68.83	78.59	205334.	840076.	10000.	0.	45.80	24196.	864271.
1914	2	234000.	1754.	2500.	147.69	69.29	78.39	223254.	824892.	10000.	0.	45.80	21854.	846746.
1914	3	225000.	5120.	2800.	148.35	69.04	79.31	217320.	896427.	10000.	0.	45.80	24196.	920623.
1914	4	244000.	16399.	3100.	148.47	70.03	78.44	247299.	977879.	10000.	0.	45.80	23415.	1001294.
1914	5	255000.	2474.	3200.	148.85	70.56	78.29	244274.	997221.	10000.	0.	39.00	19685.	1016906.
1914	6	246000.	1472.	3300.	149.20	69.55	79.65	234172.	937407.	10000.	0.	39.00	19050.	956456.
1914	7	240000.	837.	3300.	149.44	69.15	80.29	227537.	947349.	10000.	0.	39.00	19685.	967033.
1914	8	234000.	894.	3300.	149.59	68.69	80.90	221594.	928227.	10000.	0.	39.00	19685.	947911.
1914	9	247000.	954.	3200.	149.41	68.92	80.49	234754.	947063.	10000.	0.	39.00	19050.	966112.
1914	10	241000.	1191.	3200.	149.34	68.82	80.52	228991.	955385.	10000.	0.	39.00	19685.	975070.
1914	11	228000.	2064.	3200.	149.28	68.54	80.74	216864.	877789.	10000.	0.	45.80	23415.	901204.
1914	12	214000.	1562.	2900.	149.24	68.61	80.63	202662.	845792.	10000.	0.	45.80	24196.	869988.
1915	1	210000.	3706.	2500.	147.53	68.49	79.04	201206.	826203.	10000.	0.	45.80	24196.	850399.
1915	2	207000.	5193.	2500.	148.22	68.43	79.79	199693.	746033.	10000.	0.	45.80	21854.	767887.
1915	3	216000.	11267.	2800.	148.41	68.74	79.67	214467.	887630.	10000.	0.	45.80	24196.	911826.
1915	4	189000.	11575.	3100.	149.61	68.29	81.32	187475.	760403.	10000.	0.	45.80	23415.	783819.
1915	5	192000.	3602.	3200.	150.14	68.84	81.30	182402.	763069.	10000.	0.	39.00	19685.	782754.
1915	6	207000.	1692.	3300.	149.96	68.69	81.27	195392.	793489.	10000.	0.	39.00	19050.	812539.
1915	7	215000.	920.	3300.	149.92	68.64	81.28	202620.	851280.	10000.	0.	39.00	19685.	870965.
1915	8	228000.	677.	3300.	149.70	68.74	80.96	215377.	902707.	10000.	0.	39.00	19685.	922392.
1915	9	266000.	710.	3200.	149.35	69.63	79.72	253510.	1012679.	10000.	0.	39.00	19050.	1031728.
1915	10	262000.	589.	3200.	149.23	69.58	79.65	249389.	1029589.	10000.	0.	39.00	19685.	1049274.
1915	11	247000.	1051.	3200.	149.06	69.12	79.94	234851.	942652.	10000.	0.	45.80	23415.	966067.
1915	12	217000.	1864.	2900.	149.16	68.74	80.43	205964.	858198.	10000.	0.	45.80	24196.	882394.

81-06-15-10:52

PLAN DE REGULATION DU SAINT-LAURENT ERIE 25 CAT1

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1916	1	219000.	4284.	2500.	147.28	69.17	78.11	210784.	859187.	10000.	0.	45.80	24196.	883383.
1916	2	246000.	3453.	2500.	147.52	70.06	77.46	235000.	891703.	11953.	0.	45.46	26630.	918334.
1916	3	250000.	6961.	2800.	148.04	69.97	78.07	240000.	978370.	14161.	0.	45.08	33212.	1011583.
1916	4	262000.	14205.	3100.	148.47	71.88	76.58	263105.	1021581.	10000.	0.	45.80	23415.	1044996.
1916	5	280000.	6900.	3200.	148.84	73.17	75.67	273700.	1087658.	10000.	0.	39.00	19685.	1107342.
1916	6	296000.	2549.	3300.	149.12	72.36	76.76	285249.	1102943.	10000.	0.	39.00	19050.	1121992.
1916	7	306000.	1574.	3300.	149.30	71.30	78.00	288000.	1161127.	16274.	0.	39.00	32021.	1193148.
1916	8	310000.	815.	3300.	149.38	70.87	78.51	288000.	1165940.	19515.	0.	39.00	38393.	1204333.
1916	9	294000.	927.	3200.	149.37	70.31	79.06	281727.	1110906.	10000.	0.	39.00	19050.	1129955.
1916	10	264000.	2051.	3200.	149.23	69.73	79.50	252851.	1041844.	10000.	0.	39.00	19685.	1061528.
1916	11	252000.	3192.	3200.	149.02	69.70	79.32	241992.	965074.	10000.	0.	45.80	23415.	988489.
1916	12	222000.	2806.	2900.	149.04	69.41	79.63	211906.	876514.	10000.	0.	45.80	24196.	900709.
1917	1	210000.	3076.	2500.	147.55	68.74	78.81	200576.	821643.	10000.	0.	45.80	24196.	845839.
1917	2	224000.	2134.	2500.	147.87	68.98	78.89	213634.	792580.	10000.	0.	45.80	21854.	814434.
1917	3	230000.	7594.	2800.	148.22	69.32	78.90	224794.	923865.	10000.	0.	45.80	24196.	948060.
1917	4	262000.	16498.	3100.	148.47	71.20	77.27	265398.	1035753.	10000.	0.	45.80	23415.	1059168.
1917	5	267000.	5494.	3200.	148.84	71.70	77.14	259294.	1045813.	10000.	0.	39.00	19685.	1065497.
1917	6	272000.	2450.	3300.	149.12	71.68	77.44	261150.	1021540.	10000.	0.	39.00	19050.	1040589.
1917	7	293000.	1642.	3300.	149.30	71.37	77.93	281342.	1135952.	10000.	0.	39.00	19685.	1155636.
1917	8	308000.	1540.	3300.	149.38	71.27	78.11	288000.	1162131.	18240.	0.	39.00	35887.	1198017.
1917	9	300000.	1253.	3200.	149.37	70.69	78.68	288000.	1129809.	10053.	0.	39.00	19151.	1148959.
1917	10	285000.	2993.	3200.	149.25	70.26	78.99	274793.	1121429.	10000.	0.	39.00	19685.	1141113.
1917	11	283000.	2531.	3200.	149.04	70.44	78.60	272331.	1072779.	10000.	0.	45.80	23415.	1096194.
1917	12	258000.	1212.	2900.	148.70	70.12	78.58	246312.	1007797.	10000.	0.	45.80	24196.	1031993.
1918	1	216000.	1070.	2500.	147.44	68.61	78.82	204570.	838763.	10000.	0.	45.80	24196.	862959.
1918	2	219000.	3353.	2500.	147.96	68.71	79.25	209853.	780979.	10000.	0.	45.80	21854.	802833.
1918	3	252000.	8268.	2800.	148.04	69.97	78.07	240000.	978370.	17468.	0.	44.50	40154.	1018525.
1918	4	271000.	14279.	3100.	148.47	71.40	77.07	272179.	1058791.	10000.	0.	45.80	23415.	1082206.
1918	5	260000.	4946.	3200.	148.83	71.10	77.74	251746.	1021795.	10000.	0.	39.00	19685.	1041480.
1918	6	246000.	2200.	3300.	149.19	70.11	79.08	234900.	935445.	10000.	0.	39.00	19050.	954494.
1918	7	248000.	1401.	3300.	149.35	69.96	79.39	236101.	974229.	10000.	0.	39.00	19685.	993913.
1918	8	252000.	900.	3300.	149.40	69.45	79.95	239600.	993298.	10000.	0.	39.00	19685.	1012983.
1918	9	260000.	1522.	3200.	149.35	69.65	79.69	248322.	992673.	10000.	0.	39.00	19050.	1011723.
1918	10	260000.	4415.	3200.	149.23	70.31	78.92	251215.	1030134.	10000.	0.	39.00	19685.	1049818.
1918	11	263000.	7483.	3200.	149.03	70.89	78.13	257283.	1013038.	10000.	0.	45.80	23415.	1036453.
1918	12	246000.	6238.	2900.	148.72	70.52	78.20	239338.	976778.	10000.	0.	45.80	24196.	1000973.
1919	1	226000.	3452.	2500.	147.28	69.41	77.86	210952.	857865.	10000.	0.	45.80	24196.	882061.
1919	2	249000.	1885.	2500.	147.52	69.85	77.68	235000.	862584.	13385.	0.	45.21	28501.	891085.
1919	3	253000.	10480.	2800.	148.04	70.62	77.43	240000.	972877.	20680.	0.	43.94	46707.	1019584.
1919	4	260000.	16789.	3100.	148.47	71.37	77.09	263689.	1027964.	10000.	0.	45.80	23415.	1051379.
1919	5	277000.	6768.	3200.	148.84	72.94	75.90	270568.	1077919.	10000.	0.	39.00	19685.	1097603.
1919	6	296000.	2751.	3300.	149.12	72.18	76.94	285451.	1105200.	10000.	0.	39.00	19050.	1124249.
1919	7	302000.	1669.	3300.	149.30	70.89	78.41	288000.	1164925.	12369.	0.	39.00	24343.	1189268.
1919	8	295000.	900.	3300.	149.38	70.34	79.05	282600.	1151086.	10000.	0.	39.00	19685.	1170770.
1919	9	271000.	1012.	3200.	149.36	69.86	79.51	258812.	1030791.	10000.	0.	39.00	19050.	1049840.
1919	10	252000.	2736.	3200.	149.24	69.73	79.52	241536.	997166.	10000.	0.	39.00	19685.	1016851.
1919	11	237000.	3694.	3200.	149.13	69.80	79.33	227494.	908379.	10000.	0.	45.80	23415.	931794.
1919	12	213000.	1681.	2900.	149.26	69.35	79.91	201781.	835886.	10000.	0.	45.80	24196.	860082.

81-06-15-10:52

PLAN DE REGULATION DU SAINT-LAURENT ERIE 25 CAT1

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1920	1	210000.	918.	2500.	147.61	68.71	78.91	198418.	813166.	10000.	0.	45.80	24196.	837361.
1920	2	207000.	1278.	2500.	148.34	68.49	79.85	195778.	757322.	10000.	0.	45.80	22635.	779957.
1920	3	204000.	8627.	2800.	148.77	68.86	79.91	199827.	827507.	10000.	0.	45.80	24196.	851703.
1920	4	188000.	19470.	3100.	149.38	69.27	80.11	194370.	779636.	10000.	0.	45.80	23415.	803051.
1920	5	194000.	3454.	3200.	150.07	69.35	80.72	184254.	766441.	10000.	0.	39.00	19685.	786126.
1920	6	211000.	1996.	3300.	149.84	68.87	80.97	199696.	809016.	10000.	0.	39.00	19050.	828066.
1920	7	220000.	1017.	3300.	149.79	68.87	80.93	207717.	870002.	10000.	0.	39.00	19685.	889687.
1920	8	234000.	987.	3300.	149.59	69.07	80.52	221687.	925198.	10000.	0.	39.00	19685.	944882.
1920	9	267000.	1184.	3200.	149.35	69.70	79.65	254984.	1017610.	10000.	0.	39.00	19050.	1036660.
1920	10	266000.	2158.	3200.	149.23	69.63	79.61	254958.	1051062.	10000.	0.	39.00	19685.	1070746.
1920	11	264000.	2242.	3200.	149.01	69.78	79.24	253042.	1006625.	10000.	0.	45.80	23415.	1030041.
1920	12	255000.	5378.	2900.	148.70	70.37	78.33	247478.	1010227.	10000.	0.	45.80	24196.	1034423.
1921	1	220000.	2749.	2500.	147.29	69.04	78.25	210249.	858048.	10000.	0.	45.80	24196.	882243.
1921	2	250000.	1931.	2500.	147.52	69.69	77.83	235000.	863755.	14431.	0.	45.03	30517.	894272.
1921	3	257000.	13560.	2800.	148.04	71.26	76.78	240000.	967490.	27760.	0.	42.71	60491.	1027981.
1921	4	259000.	14187.	3100.	148.47	71.35	77.12	260087.	1014858.	10000.	0.	45.80	23415.	1038273.
1921	5	247000.	1422.	3200.	148.92	70.56	78.35	235222.	961619.	10000.	0.	39.00	19685.	981304.
1921	6	236000.	1206.	3300.	149.32	69.35	79.97	223906.	899559.	10000.	0.	39.00	19050.	918609.
1921	7	238000.	635.	3300.	149.47	69.02	80.45	225335.	939671.	10000.	0.	39.00	19685.	959356.
1921	8	226000.	827.	3300.	149.73	68.61	81.12	213527.	896357.	10000.	0.	39.00	19685.	916041.
1921	9	223000.	1014.	3200.	149.75	68.46	81.29	210814.	857825.	10000.	0.	39.00	19050.	876875.
1921	10	223000.	2472.	3200.	149.59	68.56	81.03	212272.	890258.	10000.	0.	39.00	19685.	909943.
1921	11	221000.	2449.	3200.	149.40	68.66	80.74	210249.	850763.	10000.	0.	45.80	23415.	874178.
1921	12	218000.	1881.	2900.	149.14	68.98	80.16	206981.	860216.	10000.	0.	45.80	24196.	884412.
1922	1	210000.	1060.	2500.	147.61	68.61	79.00	198560.	814493.	10000.	0.	45.80	24196.	838689.
1922	2	207000.	1320.	2500.	148.34	68.43	79.91	195820.	731825.	10000.	0.	45.80	21854.	753679.
1922	3	218000.	26997.	2800.	148.12	69.35	78.77	232197.	952943.	10000.	0.	45.80	24196.	977139.
1922	4	238000.	16413.	3100.	148.50	71.55	76.95	241313.	942664.	10000.	0.	45.80	23415.	966079.
1922	5	260000.	3547.	3200.	148.83	71.78	77.05	250347.	1010486.	10000.	0.	39.00	19685.	1030171.
1922	6	264000.	11774.	3300.	149.12	70.56	78.56	262474.	1036056.	10000.	0.	39.00	19050.	1055106.
1922	7	279000.	4152.	3300.	149.30	70.44	78.86	269852.	1101558.	10000.	0.	39.00	19685.	1121242.
1922	8	276000.	8026.	3300.	149.38	70.01	79.38	270726.	1109655.	10000.	0.	39.00	19685.	1129339.
1922	9	278000.	3669.	3200.	149.37	69.96	79.41	268469.	1065869.	10000.	0.	39.00	19050.	1084918.
1922	10	267000.	3311.	3200.	149.24	69.65	79.59	257111.	1059290.	10000.	0.	39.00	19685.	1078974.
1922	11	238000.	4136.	3200.	149.12	68.92	80.20	228936.	921530.	10000.	0.	45.80	23415.	944946.
1922	12	212000.	3798.	2900.	149.23	68.46	80.77	202898.	848089.	10000.	0.	45.80	24196.	872285.
1923	1	210000.	2188.	2500.	147.58	68.40	79.18	199688.	820823.	10000.	0.	45.80	24196.	845019.
1923	2	207000.	640.	2500.	148.36	68.24	80.12	195140.	730721.	10000.	0.	45.80	21854.	752576.
1923	3	204000.	3252.	2800.	148.93	68.24	80.69	194452.	810842.	10000.	0.	45.80	24196.	835038.
1923	4	188000.	25752.	3100.	149.20	68.69	80.51	200652.	809168.	10000.	0.	45.80	23415.	832583.
1923	5	195000.	10450.	3200.	149.80	70.64	79.16	192250.	788607.	10000.	0.	39.00	19685.	808291.
1923	6	210000.	5445.	3300.	149.77	69.63	80.14	202145.	812348.	10000.	0.	39.00	19050.	831397.
1923	7	219000.	1202.	3300.	149.81	68.89	80.92	206902.	866471.	10000.	0.	39.00	19685.	886156.
1923	8	222000.	844.	3300.	149.82	68.64	81.18	209544.	879989.	10000.	0.	39.00	19685.	899674.
1923	9	223000.	758.	3200.	149.76	68.72	81.04	210558.	854638.	10000.	0.	39.00	19050.	873688.
1923	10	220000.	872.	3200.	149.69	68.49	81.20	207672.	872243.	10000.	0.	39.00	19685.	891927.
1923	11	216000.	2353.	3200.	149.51	68.49	81.03	205153.	832197.	10000.	0.	45.80	23415.	855612.
1923	12	225000.	6246.	2900.	148.93	69.41	79.52	218346.	902520.	10000.	0.	45.80	24196.	926716.

81-06-15-10:52

PLAN DE REGULATION DU SAINT-LAURENT ERIE 25 CAT1

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1916	1	219000.	4284.	2500.	147.28	69.17	78.11	210784.	859187.	10000.	0.	45.80	24196.	883383.
1916	2	246000.	3453.	2500.	147.52	70.06	77.46	235000.	891703.	11953.	0.	45.46	26630.	918334.
1916	3	250000.	6961.	2800.	148.04	69.97	78.07	240000.	978370.	14161.	0.	45.08	33212.	1011583.
1916	4	262000.	14205.	3100.	148.47	71.88	76.58	263105.	1021581.	10000.	0.	45.80	23415.	1044996.
1916	5	280000.	6900.	3200.	148.84	73.17	75.67	273700.	1087658.	10000.	0.	39.00	19685.	1107342.
1916	6	296000.	2549.	3300.	149.12	72.36	76.76	285249.	1102943.	10000.	0.	39.00	19050.	1121992.
1916	7	306000.	1574.	3300.	149.30	71.30	78.00	288000.	1161127.	16274.	0.	39.00	32021.	1193148.
1916	8	310000.	815.	3300.	149.38	70.87	78.51	286000.	1165940.	19515.	0.	39.00	38393.	1204333.
1916	9	294000.	927.	3200.	149.37	70.31	79.06	281727.	1110906.	10000.	0.	39.00	19050.	1129955.
1916	10	264000.	2051.	3200.	149.23	69.73	79.50	252851.	1041844.	10000.	0.	39.00	19685.	1061528.
1916	11	252000.	3192.	3200.	149.02	69.70	79.32	241992.	965074.	10000.	0.	45.80	23415.	988489.
1916	12	222000.	2806.	2900.	149.04	69.41	79.63	211906.	876514.	10000.	0.	45.80	24196.	900709.
1917	1	210000.	3076.	2500.	147.55	68.74	78.81	200576.	821643.	10000.	0.	45.80	24196.	845839.
1917	2	224000.	2134.	2500.	147.67	68.98	78.89	213634.	792580.	10000.	0.	45.80	21854.	814434.
1917	3	230000.	7594.	2800.	148.22	69.32	78.90	224794.	923865.	10000.	0.	45.80	24196.	948060.
1917	4	262000.	16498.	3100.	148.47	71.20	77.27	265398.	1035753.	10000.	0.	45.80	23415.	1059168.
1917	5	267000.	5494.	3200.	148.84	71.70	77.14	259294.	1045813.	10000.	0.	39.00	19685.	1065497.
1917	6	272000.	2450.	3300.	149.12	71.68	77.44	261150.	1021540.	10000.	0.	39.00	19050.	1040589.
1917	7	293000.	1642.	3300.	149.30	71.37	77.93	281342.	1135952.	10000.	0.	39.00	19685.	1155636.
1917	8	308000.	1540.	3300.	149.38	71.27	78.11	288000.	1162131.	18240.	0.	39.00	35887.	1198017.
1917	9	300000.	1253.	3200.	149.37	70.69	78.68	286000.	1129809.	10053.	0.	39.00	19151.	1148959.
1917	10	285000.	2993.	3200.	149.25	70.26	78.99	274793.	1121429.	10000.	0.	39.00	19685.	1141113.
1917	11	283000.	2531.	3200.	149.04	70.44	78.60	272331.	1072779.	10000.	0.	45.80	23415.	1096194.
1917	12	258000.	1212.	2900.	148.70	70.12	78.58	246312.	1007797.	10000.	0.	45.80	24196.	1031993.
1918	1	216000.	1070.	2500.	147.44	68.61	78.82	204570.	838763.	10000.	0.	45.80	24196.	862959.
1918	2	219000.	3353.	2500.	147.96	68.71	79.25	209853.	780979.	10000.	0.	45.80	21854.	802833.
1918	3	252000.	8268.	2800.	148.04	69.97	78.07	240000.	978370.	17468.	0.	44.50	40154.	1018525.
1918	4	271000.	14279.	3100.	148.47	71.40	77.07	272179.	1058791.	10000.	0.	45.80	23415.	1082206.
1918	5	260000.	4946.	3200.	148.83	71.10	77.74	251746.	1021795.	10000.	0.	39.00	19685.	1041480.
1918	6	246000.	2200.	3300.	149.19	70.11	79.08	234900.	935445.	10000.	0.	39.00	19050.	954494.
1918	7	248000.	1401.	3300.	149.35	69.96	79.39	236101.	974229.	10000.	0.	39.00	19685.	993913.
1918	8	252000.	900.	3300.	149.40	69.45	79.95	239600.	993298.	10000.	0.	39.00	19685.	1012983.
1918	9	260000.	1522.	3200.	149.35	69.65	79.69	248322.	992673.	10000.	0.	39.00	19050.	1011723.
1918	10	260000.	4415.	3200.	149.23	70.31	78.92	251215.	1030134.	10000.	0.	39.00	19685.	1049818.
1918	11	263000.	7483.	3200.	149.03	70.89	78.13	257283.	1013038.	10000.	0.	45.80	23415.	1036453.
1918	12	246000.	6238.	2900.	148.72	70.52	78.20	239338.	976778.	10000.	0.	45.80	24196.	1000973.
1919	1	220000.	3452.	2500.	147.28	69.41	77.86	210952.	857865.	10000.	0.	45.80	24196.	882061.
1919	2	249000.	1885.	2500.	147.52	69.85	77.68	235000.	862584.	13385.	0.	45.21	28501.	891085.
1919	3	253000.	10480.	2800.	148.04	70.62	77.43	240000.	972877.	20680.	0.	43.94	46707.	1019584.
1919	4	260000.	16789.	3100.	148.47	71.37	77.09	263689.	1027964.	10000.	0.	45.80	23415.	1051379.
1919	5	277000.	6768.	3200.	148.84	72.94	75.90	270568.	1077919.	10000.	0.	39.00	19685.	1097603.
1919	6	296000.	2751.	3300.	149.12	72.18	76.94	285451.	1105200.	10000.	0.	39.00	19050.	1124249.
1919	7	302000.	1669.	3300.	149.30	70.89	78.41	288000.	1164925.	12369.	0.	39.00	24343.	1189268.
1919	8	295000.	900.	3300.	149.38	70.34	79.05	282600.	1151086.	10000.	0.	39.00	19685.	1170770.
1919	9	271000.	1012.	3200.	149.36	69.86	79.51	258812.	1030791.	10000.	0.	39.00	19050.	1049840.
1919	10	252000.	2736.	3200.	149.24	69.73	79.52	241536.	997166.	10000.	0.	39.00	19685.	1016851.
1919	11	237000.	3694.	3200.	149.13	69.80	79.33	227494.	908379.	10000.	0.	45.80	23415.	931794.
1919	12	213000.	1581.	2900.	149.26	69.35	79.91	201781.	835886.	10000.	0.	45.80	24196.	860082.

81-06-15-10:52

PLAN DE REGULATION DU SAINT-LAURENT ERIE 25 CAT1

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1924	1	220000.	2730.	2500.	147.30	69.23	78.07	210230.	856470.	10000.	0.	45.80	24196.	880666.
1924	2	233000.	1897.	2500.	147.70	69.35	78.35	222397.	850686.	10000.	0.	45.80	22635.	873321.
1924	3	227000.	4242.	2800.	148.33	69.32	79.01	218442.	898555.	10000.	0.	45.80	24196.	922751.
1924	4	220000.	19564.	3100.	148.66	70.08	78.57	226464.	898014.	10000.	0.	45.80	23415.	921429.
1924	5	242000.	7817.	3200.	148.90	71.73	77.18	236617.	957284.	10000.	0.	39.00	19685.	976969.
1924	6	253000.	1182.	3300.	149.14	70.77	78.38	240882.	952742.	10000.	0.	39.00	19050.	971792.
1924	7	258000.	880.	3300.	149.29	69.93	79.36	245580.	1011914.	10000.	0.	39.00	19685.	1031598.
1924	8	262000.	1575.	3300.	149.36	69.73	79.64	250275.	1032946.	10000.	0.	39.00	19685.	1052631.
1924	9	252000.	1378.	3200.	149.37	69.45	79.92	240178.	963272.	10000.	0.	39.00	19050.	982321.
1924	10	253000.	4635.	3200.	149.23	69.73	79.51	244435.	1008641.	10000.	0.	39.00	19685.	1028326.
1924	11	231000.	2856.	3200.	149.22	68.99	80.23	220656.	888692.	10000.	0.	45.80	23415.	912107.
1924	12	213000.	3857.	2900.	149.21	68.98	80.23	203957.	847901.	10000.	0.	45.80	24196.	872097.
1925	1	210000.	950.	2500.	147.61	68.49	79.12	198450.	815054.	10000.	0.	45.80	24196.	839249.
1925	2	207000.	5028.	2500.	148.23	68.80	79.43	199528.	742649.	10000.	0.	45.80	21854.	764503.
1925	3	209000.	18582.	2800.	148.40	69.57	78.83	214782.	881847.	10000.	0.	45.80	24196.	906043.
1925	4	222000.	6678.	3100.	148.84	70.39	78.46	215578.	853574.	10000.	0.	45.80	23415.	876989.
1925	5	214000.	2989.	3200.	149.47	69.93	79.54	203789.	841359.	10000.	0.	39.00	19685.	861044.
1925	6	212000.	1646.	3300.	149.82	69.45	80.37	200346.	806729.	10000.	0.	39.00	19050.	825779.
1925	7	216000.	1410.	3300.	149.88	68.99	80.88	204110.	854240.	10000.	0.	39.00	19685.	873925.
1925	8	220000.	1952.	3300.	149.83	68.79	81.04	208652.	875022.	10000.	0.	39.00	19685.	894707.
1925	9	220000.	4085.	3200.	149.75	68.64	81.11	210885.	856574.	10000.	0.	39.00	19050.	875624.
1925	10	214000.	5971.	3200.	149.71	68.54	81.17	206771.	868126.	10000.	0.	39.00	19685.	887811.
1925	11	214000.	5932.	3200.	149.48	68.84	80.64	206732.	835424.	10000.	0.	45.80	23415.	858840.
1925	12	226000.	4517.	2900.	148.94	69.60	79.34	217617.	897999.	10000.	0.	45.80	24196.	922194.
1926	1	210000.	2655.	2500.	147.56	68.80	78.76	200155.	819442.	10000.	0.	45.80	24196.	843637.
1926	2	207000.	1473.	2500.	148.33	68.43	79.91	195973.	732387.	10000.	0.	45.80	21854.	754241.
1926	3	204000.	1767.	2800.	148.98	68.37	80.61	192967.	803731.	10000.	0.	45.80	24196.	827927.
1926	4	188000.	22903.	3100.	149.28	68.79	80.49	197803.	797113.	10000.	0.	45.80	23415.	820528.
1926	5	196000.	6521.	3200.	149.90	69.98	79.91	189321.	782005.	10000.	0.	39.00	19685.	801689.
1926	6	208000.	4557.	3300.	149.85	69.65	80.19	199257.	800772.	10000.	0.	39.00	19050.	819821.
1926	7	214000.	4360.	3300.	149.86	69.12	80.73	205060.	856999.	10000.	0.	39.00	19685.	876683.
1926	8	220000.	3492.	3300.	149.80	68.74	81.06	210192.	881719.	10000.	0.	39.00	19685.	901404.
1926	9	224000.	2274.	3200.	149.71	68.66	81.04	213074.	864944.	10000.	0.	39.00	19050.	883994.
1926	10	252000.	5500.	3200.	149.23	69.40	79.84	244300.	1011088.	10000.	0.	39.00	19685.	1030772.
1926	11	266000.	6796.	3200.	149.04	70.44	78.60	259596.	1025730.	10000.	0.	45.80	23415.	1049145.
1926	12	265000.	2141.	2900.	148.71	70.98	77.72	254241.	1031375.	10000.	0.	45.80	24196.	1055571.
1927	1	220000.	1488.	2500.	147.33	69.29	78.03	208988.	850998.	10000.	0.	45.80	24196.	875193.
1927	2	246000.	2141.	2500.	147.52	70.15	77.37	235000.	860260.	10641.	0.	45.69	23127.	883387.
1927	3	252000.	11078.	2800.	148.04	71.14	76.90	240000.	968508.	20278.	0.	44.01	45897.	1014406.
1927	4	256000.	2930.	3100.	148.48	70.26	78.21	245830.	970388.	10000.	0.	45.80	23415.	993803.
1927	5	236000.	3767.	3200.	149.02	69.91	79.11	226567.	932989.	10000.	0.	39.00	19685.	952674.
1927	6	233000.	1551.	3300.	149.36	69.86	79.51	221251.	885003.	10000.	0.	39.00	19050.	904053.
1927	7	238000.	1928.	3300.	149.45	69.63	79.82	226628.	939444.	10000.	0.	39.00	19685.	959129.
1927	8	254000.	1481.	3300.	149.38	69.80	79.58	242181.	1000322.	10000.	0.	39.00	19685.	1020006.
1927	9	251000.	1025.	3200.	149.38	69.37	80.01	238825.	958739.	10000.	0.	39.00	19050.	977789.
1927	10	246000.	1280.	3200.	149.29	69.30	79.99	234080.	971394.	10000.	0.	39.00	19685.	991079.
1927	11	242000.	16500.	3200.	149.01	70.11	78.91	245300.	974243.	10000.	0.	45.80	23415.	997658.
1927	12	254000.	15635.	2900.	148.71	71.02	77.70	256735.	1040849.	10000.	0.	45.80	24196.	1065044.

81-06-15-10:52

PLAN DE REGULATION DU SAINT-LAURENT ERIE 25 CAT1

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1928	1	220000.	5460.	2500.	147.23	69.72	77.51	212960.	863411.	10000.	0.	45.80	24196.	887607.
1928	2	257000.	2620.	2500.	147.52	70.58	76.94	235000.	887650.	22120.	0.	43.69	46385.	934036.
1928	3	264000.	6050.	2800.	148.04	70.86	77.18	240000.	970812.	27250.	0.	42.80	59529.	1030341.
1928	4	266000.	18189.	3100.	148.47	72.24	76.23	271089.	1047790.	10000.	0.	45.80	23415.	1071205.
1928	5	265000.	5657.	3200.	148.83	72.97	75.87	257457.	1028004.	10000.	0.	39.00	19685.	1047689.
1928	6	254000.	2667.	3300.	149.13	71.10	78.03	243367.	959435.	10000.	0.	39.00	19050.	978485.
1928	7	266000.	1862.	3300.	149.29	70.49	78.80	254562.	1042159.	10000.	0.	39.00	19685.	1061843.
1928	8	279000.	2317.	3300.	149.38	70.46	78.92	268017.	1095110.	10000.	0.	39.00	19685.	1114794.
1928	9	279000.	1653.	3200.	149.37	70.36	79.01	267453.	1058470.	10000.	0.	39.00	19050.	1077519.
1928	10	264000.	4910.	3200.	149.24	70.74	78.49	255710.	1043905.	10000.	0.	39.00	19685.	1063590.
1928	11	261000.	6010.	3200.	149.02	70.97	78.05	253810.	999249.	10000.	0.	45.80	23415.	1022664.
1928	12	248000.	2930.	2900.	148.73	70.68	78.05	238030.	970285.	10000.	0.	45.80	24196.	994481.
1929	1	220000.	1634.	2500.	147.32	69.66	77.66	209134.	848616.	10000.	0.	45.80	24196.	872812.
1929	2	255000.	1217.	2500.	147.52	70.37	77.16	235000.	858645.	18717.	0.	44.29	38590.	897236.
1929	3	264000.	14771.	2800.	148.04	71.42	76.63	240000.	966224.	35971.	0.	41.28	75339.	1041563.
1929	4	283000.	17010.	3100.	148.47	72.36	76.10	286910.	1103166.	10000.	0.	45.80	23415.	1126581.
1929	5	302000.	10096.	3200.	148.84	73.55	75.29	288000.	1136781.	20896.	0.	39.00	41108.	1177889.
1929	6	306000.	2019.	3300.	149.12	71.91	77.21	288000.	1116640.	16719.	0.	39.00	31835.	1148475.
1929	7	305000.	1414	3300.	149.30	71.30	78.00	288000.	1161127.	15114.	0.	39.00	29740.	1190867.
1929	8	309000.	691.	3300.	149.38	70.89	78.49	288000.	1165701.	18391.	0.	39.00	36184.	1201884.
1929	9	297000.	467	3200.	149.37	70.49	78.88	284267.	1118381.	10000.	0.	39.00	19050.	1137430.
1929	10	282000.	1005.	3200.	149.25	70.21	79.04	269805.	1103054.	10000.	0.	39.00	19685.	1122738.
1929	11	272000.	1677.	3200.	149.04	70.16	78.88	260477.	1031484.	10000.	0.	45.80	23415.	1054898.
1929	12	254000.	565.	2900.	148.71	70.03	78.68	241665.	990256.	10000.	0.	45.80	24196.	1014452.
1930	1	220000.	8800.	2500.	147.16	69.35	77.81	216300.	879703.	10000.	0.	45.80	24196.	903899.
1930	2	259000.	5146.	2500.	147.52	70.28	77.25	235000.	859336.	26646.	0.	42.91	52733.	912069.
1930	3	280000.	6757.	2800.	148.04	70.92	77.12	240000.	970299.	43957.	0.	39.89	88608.	1058906.
1930	4	296000.	15871.	3100.	148.47	71.50	76.96	288000.	1114447.	20771.	0.	43.93	45378.	1159824.
1930	5	296000.	5500.	3200.	148.84	71.55	77.29	288000.	1154558.	10300.	0.	39.00	20275.	1174832.
1930	6	280000.	4635.	3300.	149.12	70.99	78.13	271335.	1064908.	10000.	0.	39.00	19050.	1083957.
1930	7	278000.	1724.	3300.	149.30	70.92	78.38	266424.	1084117.	10000.	0.	39.00	19685.	1103801.
1930	8	264000.	1052.	3300.	149.36	69.91	79.46	251752.	1037138.	10000.	0.	39.00	19685.	1056823.
1930	9	254000.	695.	3200.	149.37	69.45	79.92	241495.	968327.	10000.	0.	39.00	19050.	987376.
1930	10	236000.	663.	3200.	149.41	68.99	80.41	223463.	931611.	10000.	0.	39.00	19685.	951296.
1930	11	217000.	750.	3200.	149.53	68.49	81.04	204550.	829816.	10000.	0.	45.80	23415.	853232.
1930	12	212000.	675.	2900.	149.31	68.55	80.76	199775.	834516.	10000.	0.	45.80	24196.	858712.
1931	1	210000.	538.	2500.	147.62	68.49	79.13	198038.	813384.	10000.	0.	45.80	24196.	837580.
1931	2	207000.	671.	2500.	148.36	68.37	79.99	195171.	729904.	10000.	0.	45.80	21854.	751759.
1931	3	204000.	3732.	2800.	148.92	68.37	80.55	194932.	811753.	10000.	0.	45.80	24196.	835949.
1931	4	188000.	8092.	3100.	149.77	68.44	81.33	182992.	741283.	10000.	0.	45.80	23415.	764698.
1931	5	192000.	2836.	3200.	150.17	68.49	81.68	181636.	762927.	10000.	0.	39.00	19685.	782612.
1931	6	211000.	1547.	3300.	149.85	68.66	81.18	199247.	808949.	10000.	0.	39.00	19050.	827999.
1931	7	218000.	938.	3300.	149.84	68.51	81.33	205638.	864685.	10000.	0.	39.00	19685.	884370.
1931	8	222000.	597.	3300.	149.82	68.54	81.28	209297.	879888.	10000.	0.	39.00	19685.	899573.
1931	9	222000.	1100.	3200.	149.77	68.49	81.29	209900.	854014.	10000.	0.	39.00	19050.	873064.
1931	10	214000.	1194.	3200.	149.82	68.29	81.54	201994.	850873.	10000.	0.	39.00	19685.	870557.
1931	11	208000.	3449.	3200.	149.68	68.23	81.45	198249.	807018.	10000.	0.	45.80	23415.	830433.
1931	12	210000.	3630.	2900.	149.29	68.83	80.46	200730.	836043.	10000.	0.	45.80	24196.	860238.

81-06-15-10:52

PLAN DE REGULATION DU SAINT-LAURENT ERIE 25 CAT1

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1932	1	211000.	7582.	2500.	147.40	69.17	78.23	206082.	840333.	10000.	0.	45.80	24196.	864529.
1932	2	232000.	3347.	2500.	147.69	69.69	78.00	222847.	849718.	10000.	0.	45.80	22635.	872353.
1932	3	238000.	1202.	2800.	148.20	69.66	78.53	226402.	927365.	10000.	0.	45.80	24196.	951561.
1932	4	242000.	26203.	3100.	148.46	70.84	77.61	255103.	1000448.	10000.	0.	45.80	23415.	1023863.
1932	5	245000.	4085.	3200.	148.91	70.16	78.75	235885.	967732.	10000.	0.	39.00	19685.	987417.
1932	6	227000.	2011.	3300.	149.46	69.10	80.37	215711.	869889.	10000.	0.	39.00	19050.	888938.
1932	7	221000.	1437.	3300.	149.76	68.79	80.97	209137.	876430.	10000.	0.	39.00	19685.	896115.
1932	8	222000.	1445.	3300.	149.80	68.72	81.09	210145.	881753.	10000.	0.	39.00	19685.	901438.
1932	9	220000.	887.	3200.	149.82	69.04	80.78	207687.	840551.	10000.	0.	39.00	19050.	859601.
1932	10	218000.	1657.	3200.	149.72	69.40	80.32	206457.	859333.	10000.	0.	39.00	19685.	879018.
1932	11	220000.	3178.	3200.	149.41	69.96	79.45	209978.	838927.	10000.	0.	45.80	23415.	862342.
1932	12	217000.	3099.	2900.	149.14	69.48	79.66	207199.	856903.	10000.	0.	45.80	24196.	881099.
1933	1	211000.	3637.	2500.	147.51	69.23	78.28	202137.	823961.	10000.	0.	45.80	24196.	848156.
1933	2	208000.	2341.	2500.	148.28	68.80	79.48	197841.	736470.	10000.	0.	45.80	21854.	758324.
1933	3	204000.	2482.	2800.	148.95	68.58	80.37	193682.	804829.	10000.	0.	45.80	24196.	829025.
1933	4	210000.	27775.	3100.	148.68	70.82	77.87	224675.	885185.	10000.	0.	45.80	23415.	908601.
1933	5	234000.	6953.	3200.	149.00	70.92	78.08	227753.	929080.	10000.	0.	39.00	19685.	948765.
1933	6	226000.	1567.	3300.	149.49	69.40	80.09	214267.	861694.	10000.	0.	39.00	19050.	880744.
1933	7	221000.	546.	3300.	149.78	68.72	81.07	208246.	873487.	10000.	0.	39.00	19685.	893172.
1933	8	221000.	420.	3300.	149.85	68.72	81.13	208120.	873534.	10000.	0.	39.00	19685.	893218.
1933	9	221000.	522.	3200.	149.81	68.56	81.24	208322.	847154.	10000.	0.	39.00	19050.	866204.
1933	10	213000.	687.	3200.	149.86	68.34	81.52	200487.	844259.	10000.	0.	39.00	19685.	863943.
1933	11	201000.	911.	3200.	149.96	67.98	81.98	188711.	771153.	10000.	0.	45.80	23415.	794568.
1933	12	210000.	864.	2900.	149.36	68.49	80.87	197964.	827626.	10000.	0.	45.80	24196.	851822.
1934	1	210000.	1728.	2500.	147.59	68.58	79.01	199228.	817448.	10000.	0.	45.80	24196.	841644.
1934	2	207000.	986.	2500.	148.35	68.24	80.11	195486.	731994.	10000.	0.	45.80	21854.	753848.
1934	3	204000.	5696.	2800.	148.86	68.46	80.40	196896.	818973.	10000.	0.	45.80	24196.	843168.
1934	4	188000.	27500.	3100.	149.15	69.83	79.32	202400.	806727.	10000.	0.	45.80	23415.	830142.
1934	5	188000.	2663.	3200.	150.33	69.80	80.52	177463.	734614.	10000.	0.	39.00	19685.	754299.
1934	6	192000.	1245.	3300.	150.48	68.64	81.84	179945.	732349.	10000.	0.	39.00	19050.	751399.
1934	7	198000.	1131.	3300.	150.42	68.31	82.11	185831.	785282.	10000.	0.	39.00	19685.	804966.
1934	8	199000.	381.	3300.	150.46	67.91	82.56	186081.	790366.	10000.	0.	39.00	19685.	810051.
1934	9	199000.	365.	3200.	150.42	67.91	82.51	186165.	764838.	10000.	0.	39.00	19050.	783888.
1934	10	195000.	561.	3200.	150.41	67.93	82.48	182361.	773085.	10000.	0.	39.00	19685.	792770.
1934	11	198000.	911.	3200.	150.05	67.98	82.07	185711.	759135.	10000.	0.	45.80	23415.	782551.
1934	12	210000.	628.	2900.	149.36	68.92	80.44	197728.	822966.	10000.	0.	45.80	24196.	847162.
1935	1	210000.	3897.	2500.	147.53	69.08	78.45	201397.	822215.	10000.	0.	45.80	24196.	846411.
1935	2	207000.	1402.	2500.	148.34	68.68	79.66	195902.	730276.	10000.	0.	45.80	21854.	752131.
1935	3	204000.	11864.	2800.	148.68	69.14	79.54	203064.	838299.	10000.	0.	45.80	24196.	862495.
1935	4	188000.	12375.	3100.	149.62	68.77	80.85	187275.	755646.	10000.	0.	45.80	23415.	779061.
1935	5	188000.	6050.	3200.	150.20	68.66	81.53	180850.	758163.	10000.	0.	39.00	19685.	777847.
1935	6	193000.	3001.	3300.	150.38	68.34	82.04	182701.	745930.	10000.	0.	39.00	19050.	764980.
1935	7	207000.	1441.	3300.	150.12	68.64	81.48	195141.	820714.	10000.	0.	39.00	19685.	840399.
1935	8	216000.	1728.	3300.	149.93	68.54	81.39	204428.	860084.	10000.	0.	39.00	19685.	879769.
1935	9	217000.	1414.	3200.	149.88	68.46	81.42	205214.	835781.	10000.	0.	39.00	19050.	854831.
1935	10	207000.	1162.	3200.	150.01	68.18	81.82	194962.	822933.	10000.	0.	39.00	19685.	842618.
1935	11	199000.	1921.	3200.	149.99	68.16	81.83	187721.	765693.	10000.	0.	45.80	23415.	789108.
1935	12	210000.	1402.	2900.	149.34	68.74	80.61	198502.	827715.	10000.	0.	45.80	24196.	851910.

81-06-15-10:52

PLAN DE REGULATION DU SAINT-LAURENT ERIE 25 CAT1

AN	MOIS	* APPORTS CORNWALL	ST-FRANC.	* PERTES * CHENEAUX	BEAUHARNOIS AMONT	AVAL	CHUTE	TURBINE	* ENERGIE	LES CEDRES TURBINE	DEVERSE	CHUTE	* ENERGIE	TOTAL ENERGIE
1936	1	210000.	770.	2500.	147.62	68.74	78.88	198270.	812316.	10000.	0.	45.80	24196.	836512.
1936	2	207000.	891.	2500.	148.35	68.46	79.89	195391.	756089.	10000.	0.	45.80	22635.	778723.
1936	3	204000.	24278.	2800.	148.39	69.88	78.51	215478.	882064.	10000.	0.	45.80	24196.	906260.
1936	4	202000.	10332.	3100.	149.24	69.60	79.64	199232.	796129.	10000.	0.	45.80	23415.	819545.
1936	5	214000.	5775.	3200.	149.40	70.94	78.46	206575.	844247.	10000.	0.	39.00	19685.	863932.
1936	6	208000.	1638.	3300.	149.93	69.50	80.43	196338.	790500.	10000.	0.	39.00	19050.	809550.
1936	7	213000.	1312.	3300.	149.96	68.59	81.37	201012.	845168.	10000.	0.	39.00	19685.	864853.
1936	8	211000.	805.	3300.	150.09	68.29	81.80	198505.	838134.	10000.	0.	39.00	19685.	857819.
1936	9	211000.	487.	3200.	150.05	68.34	81.72	198287.	809469.	10000.	0.	39.00	19050.	828519.
1936	10	204000.	1901.	3200.	150.07	68.44	81.64	192701.	811408.	10000.	0.	39.00	19685.	831093.
1936	11	200000.	6061.	3200.	149.83	68.69	81.14	192861.	781759.	10000.	0.	45.80	23415.	805175.
1936	12	210000.	3280.	2900.	149.30	68.98	80.31	200380.	833296.	10000.	0.	45.80	24196.	857492.
1937	1	210000.	6089.	2500.	147.47	69.57	77.90	203589.	827101.	10000.	0.	45.80	24196.	851297.
1937	2	208000.	3276.	2500.	148.25	69.23	79.02	198776.	736695.	10000.	0.	45.80	21854.	758550.
1937	3	219000.	1591.	2800.	148.56	69.45	79.11	207791.	854807.	10000.	0.	45.80	24196.	879003.
1937	4	192000.	16060.	3100.	149.36	69.35	80.02	194960.	781350.	10000.	0.	45.80	23415.	804765.
1937	5	215000.	10489.	3200.	149.27	70.29	78.98	212289.	872677.	10000.	0.	39.00	19685.	892362.
1937	6	218000.	3527.	3300.	149.62	69.15	80.47	208227.	840220.	10000.	0.	39.00	19050.	859270.
1937	7	243000.	1158.	3300.	149.40	69.25	80.15	230858.	959701.	10000.	0.	39.00	19685.	979385.
1937	8	250000.	2090.	3300.	149.40	69.42	79.98	238790.	990313.	10000.	0.	39.00	19685.	1009998.
1937	9	238000.	1241.	3200.	149.50	68.99	80.51	226041.	912674.	10000.	0.	39.00	19050.	931723.
1937	10	221000.	1339.	3200.	149.66	68.69	80.97	209139.	876418.	10000.	0.	39.00	19685.	896102.
1937	11	226000.	2714.	3200.	149.30	69.48	79.83	215514.	864564.	10000.	0.	45.80	23415.	887979.
1937	12	215000.	1430.	2900.	149.22	69.29	79.93	203530.	843539.	10000.	0.	45.80	24196.	867735.
1938	1	210000.	1838.	2500.	147.59	68.95	78.63	199338.	814892.	10000.	0.	45.80	24196.	839088.
1938	2	216000.	3421.	2500.	148.03	69.23	78.80	206921.	766397.	10000.	0.	45.80	21854.	788251.
1938	3	235000.	17207.	2800.	148.05	70.86	77.19	239407.	968493.	10000.	0.	45.80	24196.	992689.
1938	4	247000.	9428.	3100.	148.49	71.45	77.04	243328.	951094.	10000.	0.	45.80	23415.	974510.
1938	5	252000.	4203.	3200.	148.86	71.07	77.79	243003.	987871.	10000.	0.	39.00	19685.	1007556.
1938	6	245000.	1257.	3300.	149.21	69.78	79.43	232957.	930789.	10000.	0.	39.00	19050.	949838.
1938	7	236000.	821.	3300.	149.49	68.99	80.50	223521.	932628.	10000.	0.	39.00	19685.	952312.
1938	8	258000.	612.	3300.	149.37	69.55	79.82	245312.	1014990.	10000.	0.	39.00	19685.	1034675.
1938	9	259000.	1013.	3200.	149.35	69.63	79.72	246813.	987132.	10000.	0.	39.00	19050.	1006182.
1938	10	262000.	860.	3200.	149.23	69.75	79.47	249660.	1029044.	10000.	0.	39.00	19685.	1048728.
1938	11	242000.	982.	3200.	149.11	69.20	79.91	229782.	922404.	10000.	0.	45.80	23415.	945820.
1938	12	216000.	2007.	2900.	149.18	68.92	80.26	205107.	853116.	10000.	0.	45.80	24196.	877312.
1939	1	210000.	1500.	2500.	147.60	68.74	78.86	199000.	815271.	10000.	0.	45.80	24196.	839467.
1939	2	208000.	1056.	2500.	148.32	68.71	79.61	196556.	732447.	10000.	0.	45.80	21854.	754302.
1939	3	223000.	3205.	2800.	148.43	69.32	79.11	213405.	878398.	10000.	0.	45.80	24196.	902594.
1939	4	235000.	29232.	3100.	148.46	70.34	78.12	251132.	989783.	10000.	0.	45.80	23415.	1013198.
1939	5	244000.	4973.	3200.	148.91	71.22	77.69	235773.	958198.	10000.	0.	39.00	19685.	977883.
1939	6	224000.	2423.	3300.	149.51	69.60	79.91	213123.	855538.	10000.	0.	39.00	19050.	874588.
1939	7	218000.	1162.	3300.	149.84	68.94	80.89	205862.	861804.	10000.	0.	39.00	19685.	881489.
1939	8	225000.	762.	3300.	149.75	68.94	80.81	212462.	889121.	10000.	0.	39.00	19685.	908806.
1939	9	234000.	640.	3200.	149.56	68.94	80.62	221440.	895226.	10000.	0.	39.00	19050.	914276.
1939	10	228000.	860.	3200.	149.53	68.79	80.74	215660.	901955.	10000.	0.	39.00	19685.	921640.
1939	11	218000.	1634.	3200.	149.48	68.69	80.79	206434.	835533.	10000.	0.	45.80	23415.	858948.
1939	12	211000.	2239.	2900.	149.30	68.80	80.50	200339.	834707.	10000.	0.	45.80	24196.	858903.

81-06-15-10:52

PLAN DE REGULATION DU SAINT-LAURENT ERIE 25 CAT1

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1940	1	210000.	868.	2500.	147.61	68.61	79.00	198368.	813715.	10000.	0.	45.80	24196.	837911.
1940	2	207000.	632.	2500.	148.36	68.46	79.90	195132.	755103.	10000.	0.	45.80	22635.	777737.
1940	3	204000.	1001.	2800.	149.00	68.40	80.60	192201.	800340.	10000.	0.	45.80	24196.	824536.
1940	4	188000.	21886.	3100.	149.31	68.97	80.34	196786.	791646.	10000.	0.	45.80	23415.	815061.
1940	5	191000.	4093.	3200.	150.16	69.10	81.06	181893.	758828.	10000.	0.	39.00	19685.	778512.
1940	6	210000.	3001.	3300.	149.84	69.65	80.18	199701.	802521.	10000.	0.	39.00	19050.	821571.
1940	7	229000.	2530.	3300.	149.58	69.45	80.13	218230.	907352.	10000.	0.	39.00	19685.	927037.
1940	8	232000.	1033.	3300.	149.62	68.97	80.65	219733.	918241.	10000.	0.	39.00	19685.	937926.
1940	9	222000.	785.	3200.	149.78	68.69	81.09	209585.	851033.	10000.	0.	39.00	19050.	870083.
1940	10	219000.	821.	3200.	149.71	68.54	81.17	206621.	867515.	10000.	0.	39.00	19685.	887200.
1940	11	212000.	1897.	3200.	149.62	68.49	81.13	200697.	814579.	10000.	0.	45.80	23415.	837995.
1940	12	211000.	4875.	2900.	149.23	68.95	80.28	202975.	844159.	10000.	0.	45.80	24196.	868355.
1941	1	220000.	3394.	2500.	147.28	69.35	77.93	210894.	858130.	10000.	0.	45.80	24196.	882326.
1941	2	229000.	2066.	2500.	147.77	69.48	78.29	218566.	806662.	10000.	0.	45.80	21854.	828516.
1941	3	214000.	2321.	2800.	148.67	68.86	79.81	203521.	842477.	10000.	0.	45.80	24196.	866673.
1941	4	189000.	15470.	3100.	149.48	69.27	80.21	191370.	767775.	10000.	0.	45.80	23415.	791191.
1941	5	192000.	1555.	3200.	150.21	68.74	81.47	180355.	755469.	10000.	0.	39.00	19685.	775153.
1941	6	206000.	1033.	3300.	150.01	68.39	81.62	193733.	789475.	10000.	0.	39.00	19050.	808525.
1941	7	210000.	498.	3300.	150.06	68.39	81.68	197198.	831362.	10000.	0.	39.00	19685.	851047.
1941	8	213000.	424.	3300.	150.04	68.41	81.63	200124.	843638.	10000.	0.	39.00	19685.	863322.
1941	9	214000.	416.	3200.	149.98	68.44	81.54	201216.	820204.	10000.	0.	39.00	19050.	839254.
1941	10	205000.	546.	3200.	150.08	68.51	81.57	192346.	809284.	10000.	0.	39.00	19685.	828968.
1941	11	203000.	1072.	3200.	149.89	68.87	81.02	190872.	772362.	10000.	0.	45.80	23415.	795777.
1941	12	210000.	1021.	2900.	149.35	69.17	80.19	198121.	822486.	10000.	0.	45.80	24196.	846682.
1942	1	210000.	1272.	2500.	147.60	69.04	78.56	198772.	811859.	10000.	0.	45.80	24196.	836054.
1942	2	218000.	954.	2500.	148.04	69.23	78.81	206454.	764699.	10000.	0.	45.80	21854.	786554.
1942	3	226000.	17663.	2800.	148.13	70.09	78.04	230863.	941372.	10000.	0.	45.80	24196.	965568.
1942	4	247000.	17069.	3100.	148.46	70.89	77.57	250969.	984481.	10000.	0.	45.80	23415.	1007896.
1942	5	260000.	1932.	3200.	148.84	70.74	78.10	248732.	1013125.	10000.	0.	39.00	19685.	1032809.
1942	6	268000.	1241.	3300.	149.11	70.51	78.60	255941.	1011982.	10000.	0.	39.00	19050.	1031032.
1942	7	257000.	447.	3300.	149.30	69.58	79.72	244147.	1009462.	10000.	0.	39.00	19685.	1029147.
1942	8	262000.	514.	3300.	149.36	69.60	79.76	249214.	1029925.	10000.	0.	39.00	19685.	1049609.
1942	9	259000.	483.	3200.	149.35	69.50	79.85	246283.	986223.	10000.	0.	39.00	19050.	1005272.
1942	10	253000.	711.	3200.	149.25	69.37	79.88	240511.	996294.	10000.	0.	39.00	19685.	1015979.
1942	11	252000.	1139.	3200.	149.03	69.50	79.53	239939.	958948.	10000.	0.	45.80	23415.	982363.
1942	12	246000.	891.	2900.	148.75	69.85	78.91	233991.	961425.	10000.	0.	45.80	24196.	985621.
1943	1	220000.	1426.	2500.	147.33	69.17	78.16	208926.	851746.	10000.	0.	45.80	24196.	875942.
1943	2	251000.	6273.	2500.	147.52	70.18	77.34	235000.	860028.	19773.	0.	44.10	40533.	900561.
1943	3	259000.	16814.	2800.	148.04	70.95	77.09	240000.	970042.	33014.	0.	41.80	70133.	1040175.
1943	4	266000.	8949.	3100.	148.47	71.02	77.45	261849.	1024163.	10000.	0.	45.80	23415.	1047579.
1943	5	282000.	12893.	3200.	148.84	73.05	75.80	281693.	1118228.	10000.	0.	39.00	19685.	1137912.
1943	6	303000.	3315.	3300.	149.12	72.01	77.11	288000.	1115747.	15015.	0.	39.00	28593.	1144339.
1943	7	306000.	2247.	3300.	149.30	71.17	78.13	288000.	1162310.	16947.	0.	39.00	33344.	1195654.
1943	8	310000.	1433.	3300.	149.38	70.89	78.49	288000.	1165701.	20133.	0.	39.00	39608.	1205309.
1943	9	302000.	950.	3200.	149.37	70.72	78.65	288000.	1129577.	11750.	0.	39.00	22380.	1151956.
1943	10	276000.	1650.	3200.	149.25	70.11	79.14	264450.	1083559.	10000.	0.	39.00	19685.	1103243.
1943	11	275000.	4533.	3200.	149.04	70.26	78.78	266333.	1052335.	10000.	0.	45.80	23415.	1075750.
1943	12	252000.	2451.	2900.	148.71	70.09	78.62	241551.	989266.	10000.	0.	45.80	24196.	1013462.

81-06-15-10:53

PLAN DE REGULATION DU SAINT-LAURENT ERIE 25 CAT1

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1944	1	210000.	1701.	2500.	147.59	68.77	78.82	199201.	815834.	10000.	0.	45.80	24196.	840030.
1944	2	220000.	1815.	2500.	147.97	68.86	79.11	209315.	805642.	10000.	0.	45.80	22635.	828277.
1944	3	221000.	15353.	2800.	148.24	69.29	78.95	223553.	919192.	10000.	0.	45.80	24196.	943388.
1944	4	226000.	13781.	3100.	148.65	69.40	79.25	226681.	904524.	10000.	0.	45.80	23415.	927940.
1944	5	245000.	4478.	3200.	148.91	70.11	78.80	236278.	969725.	10000.	0.	39.00	19685.	989410.
1944	6	250000.	1650.	3300.	149.16	69.45	79.71	238350.	954310.	10000.	0.	39.00	19050.	973360.
1944	7	252000.	852.	3300.	149.32	69.35	79.98	239552.	993349.	10000.	0.	39.00	19685.	1013033.
1944	8	241000.	518.	3300.	149.50	68.99	80.51	228218.	952068.	10000.	0.	39.00	19685.	971753.
1944	9	231000.	589.	3200.	149.61	68.79	80.82	218389.	884644.	10000.	0.	39.00	19050.	903694.
1944	10	223000.	978.	3200.	149.62	68.66	80.96	210778.	883298.	10000.	0.	39.00	19685.	902982.
1944	11	221000.	1622.	3200.	149.42	68.64	80.78	209422.	847727.	10000.	0.	45.80	23415.	871142.
1944	12	213000.	1127.	2900.	149.27	68.77	80.51	201227.	838603.	10000.	0.	45.80	24196.	862798.
1945	1	210000.	1496.	2500.	147.60	68.83	78.77	198996.	814505.	10000.	0.	45.80	24196.	838701.
1945	2	207000.	1638.	2500.	148.33	68.58	79.75	196138.	731836.	10000.	0.	45.80	21854.	753690.
1945	3	209000.	23453.	2800.	148.31	69.91	78.40	219653.	898469.	10000.	0.	45.80	24196.	922665.
1945	4	251000.	11314.	3100.	148.46	70.77	77.70	249214.	978926.	10000.	0.	45.80	23415.	1002341.
1945	5	273000.	14850.	3200.	148.84	71.25	77.59	274650.	1108045.	10000.	0.	39.00	19685.	1127729.
1945	6	288000.	3138.	3300.	149.12	71.20	77.92	277838.	1086700.	10000.	0.	39.00	19050.	1105749.
1945	7	303000.	1426.	3300.	149.30	70.84	78.46	288000.	1165403.	13126.	0.	39.00	25832.	1191234.
1945	8	303000.	561.	3300.	149.38	70.61	78.77	288000.	1168342.	12261.	0.	39.00	24131.	1192472.
1945	9	290000.	950.	3200.	149.37	70.36	79.01	277750.	1096100.	10000.	0.	39.00	19050.	1115149.
1945	10	298000.	5429.	3200.	149.25	70.92	78.33	288000.	1164240.	12229.	0.	39.00	24068.	1188307.
1945	11	294000.	5798.	3200.	149.04	70.84	78.20	286598.	1120482.	10000.	0.	45.80	23415.	1143897.
1945	12	275000.	1873.	2900.	148.73	70.77	77.96	263973.	1070989.	10000.	0.	45.80	24196.	1095184.
1946	1	220000.	4466.	2500.	147.25	69.32	77.93	211966.	862665.	10000.	0.	45.80	24196.	886861.
1946	2	256000.	2349.	2500.	147.52	70.34	77.19	235000.	858876.	20849.	0.	43.91	42494.	901370.
1946	3	265000.	13310.	2800.	148.04	71.57	76.47	240000.	964963.	35510.	0.	41.36	74538.	1039500.
1946	4	267000.	4879.	3100.	148.46	70.64	77.82	258779.	1015957.	10000.	0.	45.80	23415.	1039372.
1946	5	240000.	5951.	3200.	148.94	69.70	79.24	232751.	959309.	10000.	0.	39.00	19685.	978994.
1946	6	237000.	1225.	3300.	149.31	69.53	79.78	224925.	901993.	10000.	0.	39.00	19050.	921043.
1946	7	245000.	459.	3300.	149.39	69.17	80.22	232159.	965568.	10000.	0.	39.00	19685.	985253.
1946	8	244000.	459.	3300.	149.47	69.10	80.37	231159.	962911.	10000.	0.	39.00	19685.	982596.
1946	9	230000.	322.	3200.	149.63	68.74	80.89	217122.	880133.	10000.	0.	39.00	19050.	899182.
1946	10	224000.	2730.	3200.	149.57	68.79	80.78	213530.	893335.	10000.	0.	39.00	19685.	913020.
1946	11	231000.	6014.	3200.	149.18	69.22	79.96	223814.	899040.	10000.	0.	45.80	23415.	922456.
1946	12	215000.	4922.	2900.	149.14	69.41	79.73	207022.	856706.	10000.	0.	45.80	24196.	880902.
1947	1	210000.	3508.	2500.	147.54	69.35	78.18	201008.	818422.	10000.	0.	45.80	24196.	842617.
1947	2	232000.	4219.	2500.	147.68	70.12	77.56	223719.	820332.	10000.	0.	45.80	21854.	842186.
1947	3	227000.	7024.	2800.	148.28	69.81	78.46	221224.	905497.	10000.	0.	45.80	24196.	929692.
1947	4	249000.	17615.	3100.	148.46	71.65	76.80	253515.	987759.	10000.	0.	45.80	23415.	1011174.
1947	5	272000.	15769.	3200.	148.84	73.30	75.54	274569.	1089808.	10000.	0.	39.00	19685.	1109492.
1947	6	292000.	13192.	3300.	149.12	73.50	75.62	288000.	1102871.	13892.	0.	39.00	26456.	1129326.
1947	7	300000.	7920.	3300.	149.30	71.58	77.72	288000.	1158540.	16620.	0.	39.00	32702.	1191241.
1947	8	310000.	1512.	3300.	149.38	71.02	78.36	288000.	1164507.	20212.	0.	39.00	39764.	1204270.
1947	9	310000.	2533.	3200.	149.37	70.84	78.52	288000.	1128416.	21333.	0.	39.00	40614.	1169029.
1947	10	303000.	1323.	3200.	149.25	70.64	78.61	288000.	1166871.	13123.	0.	39.00	25826.	1192696.
1947	11	280000.	3135.	3200.	149.04	70.13	78.91	269935.	1066728.	10000.	0.	45.80	23415.	1090143.
1947	12	262000.	4140.	2900.	148.70	70.31	78.40	253240.	1033411.	10000.	0.	45.80	24196.	1057607.

81-06-15-10:53

PLAN DE REGULATION DU SAINT-LAURENT ERIE 25 CAT1

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1948	1	220000.	1245.	2500.	147.33	69.01	78.32	208745.	852271.	10000.	0.	45.80	24196.	876467.
1948	2	234000.	2412.	2500.	147.67	69.48	78.20	223912.	855347.	10000.	0.	45.80	22635.	877982.
1948	3	244000.	11962.	2800.	148.04	70.65	77.40	240000.	972618.	13162.	0.	45.25	31076.	1003694.
1948	4	274000.	6057.	3100.	148.47	71.05	77.42	266957.	1042773.	10000.	0.	45.80	23415.	1066188.
1948	5	284000.	5095.	3200.	148.84	70.94	77.90	275895.	1115450.	10000.	0.	39.00	19685.	1135134.
1948	6	282000.	1237.	3300.	149.12	70.39	78.73	269937.	1065177.	10000.	0.	39.00	19050.	1084226.
1948	7	260000.	734.	3300.	149.29	69.55	79.74	247434.	1022660.	10000.	0.	39.00	19685.	1042345.
1948	8	252000.	671.	3300.	149.40	69.30	80.10	239371.	993767.	10000.	0.	39.00	19685.	1013452.
1948	9	244000.	267.	3200.	149.44	69.02	80.42	231067.	931926.	10000.	0.	39.00	19050.	950976.
1948	10	225000.	475.	3200.	149.59	68.54	81.06	212275.	890496.	10000.	0.	39.00	19685.	910181.
1948	11	223000.	1595.	3200.	149.38	68.59	80.79	211395.	855913.	10000.	0.	45.80	23415.	879328.
1948	12	215000.	1496.	2900.	149.22	68.77	80.45	203596.	848278.	10000.	0.	45.80	24196.	872474.
1949	1	210000.	7472.	2500.	147.43	69.04	78.38	204972.	836866.	10000.	0.	45.80	24196.	861062.
1949	2	221000.	5299.	2500.	147.87	69.35	78.51	213799.	790399.	10000.	0.	45.80	21854.	812253.
1949	3	234000.	11424.	2800.	148.11	70.09	78.02	232624.	948318.	10000.	0.	45.80	24196.	972514.
1949	4	240000.	10143.	3100.	148.53	70.84	77.69	237043.	932221.	10000.	0.	45.80	23415.	955637.
1949	5	232000.	2561.	3200.	149.10	69.96	79.14	221361.	911802.	10000.	0.	39.00	19685.	931487.
1949	6	220000.	1103.	3300.	149.63	68.89	80.74	207803.	840694.	10000.	0.	39.00	19050.	859744.
1949	7	220000.	644.	3300.	149.80	68.79	81.01	207344.	869157.	10000.	0.	39.00	19685.	888841.
1949	8	222000.	385.	3300.	149.83	68.56	81.26	209085.	878801.	10000.	0.	39.00	19685.	898486.
1949	9	223000.	1056.	3200.	149.75	68.59	81.16	210856.	856897.	10000.	0.	39.00	19050.	875947.
1949	10	219000.	1261.	3200.	149.70	68.54	81.16	207061.	869307.	10000.	0.	39.00	19685.	888992.
1949	11	210000.	2647.	3200.	149.65	68.31	81.34	199447.	811127.	10000.	0.	45.80	23415.	834542.
1949	12	210000.	4675.	2900.	149.26	68.92	80.34	201775.	839523.	10000.	0.	45.80	24196.	863719.
1950	1	210000.	6914.	2500.	147.44	69.20	78.24	204414.	833378.	10000.	0.	45.80	24196.	857574.
1950	2	230000.	1433.	2500.	147.76	69.48	78.29	218933.	807982.	10000.	0.	45.80	21854.	829837.
1950	3	236000.	5892.	2800.	148.16	69.85	78.31	229092.	936454.	10000.	0.	45.80	24196.	960650.
1950	4	264000.	17050.	3100.	148.47	70.97	77.50	267950.	1047065.	10000.	0.	45.80	23415.	1070480.
1950	5	273000.	2412.	3200.	148.84	70.87	77.97	262212.	1064358.	10000.	0.	39.00	19685.	1084042.
1950	6	264000.	1249.	3300.	149.11	70.23	78.87	251949.	999304.	10000.	0.	39.00	19050.	1018354.
1950	7	268000.	624.	3300.	149.29	70.06	79.23	255324.	1049038.	10000.	0.	39.00	19685.	1068722.
1950	8	270000.	832.	3300.	149.37	69.96	79.42	257532.	1059354.	10000.	0.	39.00	19685.	1079038.
1950	9	276000.	1166.	3200.	149.37	70.16	79.21	263966.	1047373.	10000.	0.	39.00	19050.	1066422.
1950	10	264000.	970.	3200.	149.23	69.80	79.42	251770.	1036895.	10000.	0.	39.00	19685.	1056580.
1950	11	261000.	5382.	3200.	149.02	70.01	79.01	253182.	1005161.	10000.	0.	45.80	23415.	1028577.
1950	12	259000.	5303.	2900.	148.70	70.55	78.15	251403.	1024031.	10000.	0.	45.80	24196.	1048227.
1951	1	220000.	7700.	2500.	147.18	69.54	77.65	215200.	873825.	10000.	0.	45.80	24196.	898021.
1951	2	257000.	4046.	2500.	147.52	70.58	76.94	235000.	857042.	23546.	0.	43.45	47326.	904368.
1951	3	277000.	18385.	2800.	148.04	71.85	76.20	240000.	962708.	50000.	2585.	38.39	96662.	1059369.
1951	4	293000.	15989.	3100.	148.47	73.40	75.07	288000.	1098244.	17889.	0.	44.43	39701.	1137944.
1951	5	306000.	2632.	3200.	148.84	72.08	76.76	288000.	1149733.	17432.	0.	39.00	34298.	1184031.
1951	6	310000.	2773.	3300.	149.12	71.05	78.07	288000.	1124331.	21473.	0.	39.00	40880.	1165211.
1951	7	307000.	4085.	3300.	149.30	71.07	78.23	288000.	1163258.	19785.	0.	39.00	38924.	1202182.
1951	8	294000.	1473.	3300.	149.38	70.41	78.97	282173.	1148781.	10000.	0.	39.00	19685.	1168465.
1951	9	284000.	1064.	3200.	149.37	70.18	79.18	271864.	1076280.	10000.	0.	39.00	19050.	1095329.
1951	10	268000.	887.	3200.	149.24	70.01	79.23	255687.	1050445.	10000.	0.	39.00	19685.	1070129.
1951	11	258000.	2840.	3200.	149.01	70.56	78.45	247640.	979269.	10000.	0.	45.80	23415.	1002684.
1951	12	251000.	1779.	2900.	148.72	70.52	78.19	239879.	978916.	10000.	0.	45.80	24196.	1003112.

81-06-15-10:53

-09-

PLAN DE REGULATION DU SAINT-LAURENT ERIE 25 CAT1

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1952	1	220000.	4478.	2500.	147.25	69.51	77.75	211978.	861221.	10000.	0.	45.80	24196.	885417.
1952	2	260000.	4439.	2500.	147.52	70.74	76.79	235000.	886471.	26939.	0.	42.85	55137.	941608.
1952	3	280000.	12610.	2800.	148.04	71.45	76.60	240000.	965970.	49810.	0.	38.88	97599.	1063569.
1952	4	298000.	14182.	3100.	148.47	72.18	76.28	288000.	1108511.	21082.	0.	43.87	45982.	1154492.
1952	5	307000.	3850.	3200.	148.84	72.13	76.71	288000.	1149277.	19650.	0.	39.00	38659.	1187935.
1952	6	309000.	2435.	3300.	149.12	71.58	77.54	288000.	1119559.	20135.	0.	39.00	38335.	1157893.
1952	7	308000.	2742.	3300.	149.30	70.97	78.33	288000.	1164210.	19442.	0.	39.00	38250.	1202459.
1952	8	297000.	821.	3300.	149.38	70.69	78.69	284521.	1154831.	10000.	0.	39.00	19685.	1174515.
1952	9	287000.	785.	3200.	149.37	70.29	79.08	274585.	1085299.	10000.	0.	39.00	19050.	1104348.
1952	10	273000.	3225.	3200.	149.25	70.08	79.17	263025.	1078320.	10000.	0.	39.00	19685.	1098004.
1952	11	248000.	2427.	3200.	149.05	69.40	79.65	237227.	949396.	10000.	0.	45.80	23415.	972811.
1952	12	244000.	5853.	2900.	148.73	70.06	78.67	236953.	971320.	10000.	0.	45.80	24196.	995516.
1953	1	220000.	4635.	2500.	147.25	69.29	77.96	212135.	863590.	10000.	0.	45.80	24196.	887786.
1953	2	245000.	5264.	2500.	147.52	70.15	77.37	235000.	860260.	12764.	0.	45.32	27296.	887555.
1953	3	242000.	11471.	2800.	148.04	70.77	77.27	240000.	971585.	10671.	0.	45.69	25671.	997256.
1953	4	252000.	12767.	3100.	148.46	70.97	77.49	251667.	986474.	10000.	0.	45.80	23 15.	1009889.
1953	5	254000.	8328.	3200.	148.84	70.29	78.55	249128.	1018677.	10000.	0.	39.00	19685.	1038361.
1953	6	272000.	1744.	3300.	149.12	69.98	79.14	260444.	1033629.	10000.	0.	39.00	19050.	1052678.
1953	7	273000.	1343.	3300.	149.30	69.86	79.45	261043.	1073225.	10000.	0.	39.00	19685.	1092909.
1953	8	272000.	848.	3300.	149.38	69.80	79.58	259548.	1068651.	10000.	0.	39.00	19685.	1088335.
1953	9	256000.	671.	3200.	149.36	69.35	80.01	243471.	976797.	10000.	0.	39.00	19050.	995847.
1953	10	235000.	1331.	3200.	149.41	68.87	80.54	223131.	931407.	10000.	0.	39.00	19685.	951091.
1953	11	222000.	1186.	3200.	149.41	68.56	80.85	209986.	850591.	10000.	0.	45.80	23415.	874006.
1953	12	217000.	2223.	2900.	149.16	68.80	80.36	206323.	859129.	10000.	0.	45.80	24196.	883324.
1954	1	210000.	1343.	2500.	147.60	68.71	78.89	198643.	814886.	10000.	0.	45.80	24196.	839082.
1954	2	211000.	6442.	2500.	148.08	68.98	79.10	204942.	761035.	10000.	0.	45.80	21854.	782889.
1954	3	239000.	19210.	2800.	148.04	70.43	77.61	240000.	974436.	15410.	0.	44.86	35858.	1010293.
1954	4	252000.	20153.	3100.	148.46	71.20	77.27	259053.	1012269.	10000.	0.	45.80	23415.	1035685.
1954	5	278000.	8800.	3200.	148.84	71.02	77.82	273600.	1106170.	10000.	0.	39.00	19685.	1125854.
1954	6	273000.	4989.	3300.	149.12	70.56	78.56	264689.	1044270.	10000.	0.	39.00	19050.	1063320.
1954	7	263000.	1932.	3300.	149.28	69.86	79.43	251632.	1036407.	10000.	0.	39.00	19685.	1056091.
1954	8	248000.	1261.	3300.	149.42	69.30	80.13	235961.	980218.	10000.	0.	39.00	19685.	999903.
1954	9	248000.	4596.	3200.	149.38	69.45	79.93	239396.	960268.	10000.	0.	39.00	19050.	979318.
1954	10	252000.	9507.	3200.	149.23	70.23	78.99	248307.	1019375.	10000.	0.	39.00	19685.	1039060.
1954	11	274000.	9467.	3200.	149.04	70.79	78.25	270267.	1062092.	10000.	0.	45.80	23415.	1085507.
1954	12	262000.	7307.	2900.	148.71	70.92	77.79	256407.	1040377.	10000.	0.	45.80	24196.	1064573.
1955	1	220000.	3476.	2500.	147.28	69.78	77.49	210976.	854999.	10000.	0.	45.80	24196.	879195.
1955	2	258000.	2050.	2500.	147.52	70.77	76.76	235000.	855676.	22550.	0.	43.62	45555.	901231.
1955	3	278000.	17089.	2800.	148.04	71.72	76.32	240000.	963708.	50000.	2289.	38.44	96800.	1060508.
1955	4	292000.	25103.	3100.	148.47	73.10	75.37	288000.	1100777.	26003.	0.	43.02	55312.	1156088.
1955	5	302000.	2266.	3200.	148.84	71.43	77.42	288000.	1155717.	13066.	0.	39.00	25714.	1181430.
1955	6	298000.	1426.	3300.	149.12	70.79	78.33	286126.	1119982.	10000.	0.	39.00	19050.	1139031.
1955	7	272000.	632.	3300.	149.30	69.91	79.39	259332.	1066112.	10000.	0.	39.00	19685.	1085796.
1955	8	261000.	1025.	3300.	149.36	69.55	79.81	248725.	1028461.	10000.	0.	39.00	19685.	1048146.
1955	9	251000.	1213.	3200.	149.38	69.35	80.03	239013.	959683.	10000.	0.	39.00	19050.	978733.
1955	10	246000.	1202.	3200.	149.29	69.30	79.99	234002.	971083.	10000.	0.	39.00	19685.	990768.
1955	11	264000.	1213.	3200.	149.01	70.21	78.80	252013.	998953.	10000.	0.	45.80	23415.	1022368.
1955	12	238000.	660.	2900.	148.83	69.88	78.95	225760.	928319.	10000.	0.	45.80	24196.	952515.

81-06-15-10:53

PLAN DE REGULATION DU SAINT-LAURENT ERIE 25 CAT1

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1956	1	210000.	1135.	2500.	147.61	68.92	78.68	198635.	812297.	10000.	0.	45.80	24196.	836493.
1956	2	214000.	974.	2500.	148.14	68.92	79.22	202474.	779371.	10000.	0.	45.80	22635.	802006.
1956	3	224000.	2145.	2800.	148.43	69.35	79.08	213345.	877898.	10000.	0.	45.80	24196.	902094.
1956	4	235000.	20625.	3100.	148.49	70.41	78.08	242525.	956589.	10000.	0.	45.80	23415.	980005.
1956	5	263000.	9192.	3200.	148.84	71.02	77.82	258992.	1050612.	10000.	0.	39.00	19685.	1070296.
1956	6	278000.	2757.	3300.	149.12	70.82	78.30	267457.	1052257.	10000.	0.	39.00	19050.	1071306.
1956	7	275000.	931.	3300.	149.30	70.26	79.04	262631.	1075610.	10000.	0.	39.00	19685.	1095294.
1956	8	265000.	561.	3300.	149.36	69.93	79.43	252261.	1038908.	10000.	0.	39.00	19685.	1058592.
1956	9	265000.	766.	3200.	149.34	70.18	79.16	252566.	1004163.	10000.	0.	39.00	19050.	1023213.
1956	10	251000.	703.	3200.	149.26	69.93	79.33	238503.	983334.	10000.	0.	39.00	19685.	1003019.
1956	11	229000.	809.	3200.	149.29	69.07	80.22	216609.	872252.	10000.	0.	45.80	23415.	895667.
1956	12	214000.	2050.	2900.	149.23	69.11	80.12	203150.	843560.	10000.	0.	45.80	24196.	867755.
1957	1	210000.	2074.	2500.	147.58	69.04	78.53	199574.	815101.	10000.	0.	45.80	24196.	839297.
1957	2	217000.	2671.	2500.	148.02	69.32	78.70	207171.	766619.	10000.	0.	45.80	21854.	788473.
1957	3	224000.	8407.	2800.	148.31	69.85	78.46	219607.	898800.	10000.	0.	45.80	24196.	922995.
1957	4	217000.	4635.	3100.	149.00	69.10	79.90	208535.	836708.	10000.	0.	45.80	23415.	860124.
1957	5	210000.	3795.	3200.	149.55	68.92	80.64	200595.	836995.	10000.	0.	39.00	19685.	856679.
1957	6	220000.	1991.	3300.	149.61	68.89	80.72	208691.	844175.	10000.	0.	39.00	19050.	863225.
1957	7	246000.	1300.	3300.	149.37	70.16	79.21	234000.	964112.	10000.	0.	39.00	19685.	983797.
1957	8	257000.	773.	3300.	149.38	69.63	79.75	244473.	1010984.	10000.	0.	39.00	19685.	1030669.
1957	9	250000.	762.	3200.	149.39	69.55	79.84	237562.	952336.	10000.	0.	39.00	19050.	971385.
1957	10	229000.	758.	3200.	149.51	69.17	80.34	216558.	902230.	10000.	0.	39.00	19685.	921915.
1957	11	218000.	1284.	3200.	149.49	69.25	80.24	206084.	829482.	10000.	0.	45.80	23415.	852897.
1957	12	213000.	4714.	2900.	149.19	69.75	79.44	204814.	844878.	10000.	0.	45.80	24196.	869074.
1958	1	210000.	1854.	2500.	147.59	69.32	78.26	199354.	811990.	10000.	0.	45.80	24196.	836186.
1958	2	207000.	1712.	2500.	148.33	69.26	79.07	196212.	727076.	10000.	0.	45.80	21854.	748931.
1958	3	204000.	5067.	2800.	148.87	69.48	79.40	196267.	807926.	10000.	0.	45.80	24196.	832122.
1958	4	188000.	26478.	3100.	149.18	69.42	79.75	201378.	805992.	10000.	0.	45.80	23415.	829407.
1958	5	194000.	3889.	3200.	150.05	68.59	81.47	184689.	774666.	10000.	0.	39.00	19685.	794351.
1958	6	210000.	2113.	3300.	149.86	68.79	81.07	198813.	806169.	10000.	0.	39.00	19050.	825219.
1958	7	217000.	1151.	3300.	149.86	68.94	80.92	204851.	857695.	10000.	0.	39.00	19685.	877380.
1958	8	220000.	990.	3300.	149.86	68.82	81.04	207690.	870892.	10000.	0.	39.00	19685.	890577.
1958	9	225000.	1143.	3200.	149.71	68.97	80.74	212943.	861823.	10000.	0.	39.00	19050.	880873.
1958	10	238000.	3865.	3200.	149.34	69.50	79.84	228665.	947968.	10000.	0.	39.00	19685.	967653.
1958	11	230000.	3547.	3200.	149.23	69.42	79.80	220347.	883838.	10000.	0.	45.80	23415.	907253.
1958	12	213000.	1885.	2900.	149.26	69.17	80.09	201985.	838282.	10000.	0.	45.80	24196.	862478.
1959	1	210000.	2557.	2500.	147.56	68.98	78.58	200057.	817549.	10000.	0.	45.80	24196.	841745.
1959	2	207000.	2247.	2500.	148.31	68.89	79.42	196747.	731770.	10000.	0.	45.80	21854.	753624.
1959	3	214000.	8800.	2800.	148.51	69.17	79.34	210000.	866020.	10000.	0.	45.80	24196.	890215.
1959	4	242000.	20978.	3100.	148.46	70.72	77.75	249878.	981853.	10000.	0.	45.80	23415.	1005268.
1959	5	255000.	1948.	3200.	148.86	70.36	78.49	243748.	996925.	10000.	0.	39.00	19685.	1016610.
1959	6	251000.	2561.	3300.	149.15	69.75	79.39	240261.	958993.	10000.	0.	39.00	19050.	978043.
1959	7	236000.	919.	3300.	149.49	69.17	80.32	223619.	931440.	10000.	0.	39.00	19685.	951125.
1959	8	221000.	656.	3300.	149.84	68.74	81.10	208356.	874269.	10000.	0.	39.00	19685.	893953.
1959	9	221000.	683.	3200.	149.80	68.82	80.99	208483.	845618.	10000.	0.	39.00	19050.	864668.
1959	10	219000.	1225.	3200.	149.70	68.87	80.84	207025.	866263.	10000.	0.	39.00	19685.	885948.
1959	11	219000.	3017.	3200.	149.43	69.35	80.08	208817.	839386.	10000.	0.	45.80	23415.	862802.
1959	12	240000.	7346.	2900.	148.75	70.52	78.23	234446.	957399.	10000.	0.	45.80	24196.	981594.

81-06-15-10:53

PLAN DE REGULATION DU SAINT-LAURENT ERIE 25 CAT1

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1960	1	220000.	1803.	2500.	147.32	69.66	77.66	209303.	849292.	10000.	0.	45.80	24196.	873488.
1960	2	249000.	4753.	2500.	147.52	70.74	76.79	235000.	886471.	16253.	0.	44.71	35199.	921670.
1960	3	254000.	2808.	2800.	148.04	70.68	77.37	240000.	972360.	14008.	0.	45.10	32886.	1005246.
1960	4	262000.	33118.	3100.	148.47	72.46	76.00	282018.	1085042.	10000.	0.	45.80	23415.	1108457.
1960	5	281000.	3413.	3200.	148.84	72.84	76.00	271213.	1081195.	10000.	0.	39.00	19685.	1100879.
1960	6	296000.	1532.	3300.	149.12	71.20	77.92	284232.	1109596.	10000.	0.	39.00	19050.	1128645.
1960	7	286000.	498.	3300.	149.30	71.20	78.10	273198.	1107215.	10000.	0.	39.00	19685.	1126899.
1960	8	284000.	420.	3300.	149.38	70.67	78.72	271120.	1105013.	10000.	0.	39.00	19685.	1124697.
1960	9	266000.	612.	3200.	149.35	69.96	79.39	253412.	1009384.	10000.	0.	39.00	19050.	1028434.
1960	10	250000.	1052.	3200.	149.26	69.53	79.74	237852.	984365.	10000.	0.	39.00	19685.	1004049.
1960	11	234000.	1555.	3200.	149.20	69.20	80.00	222355.	893582.	10000.	0.	45.80	23415.	916998.
1960	12	215000.	718.	2900.	149.24	69.11	80.13	202818.	842205.	10000.	0.	45.80	24196.	866401.
1961	1	210000.	573.	2500.	147.62	68.83	78.79	198073.	810770.	10000.	0.	45.80	24196.	834966.
1961	2	207000.	1665.	2500.	148.33	68.80	79.53	196165.	730322.	10000.	0.	45.80	21854.	752177.
1961	3	204000.	10528.	2800.	148.72	68.71	80.01	201728.	836516.	10000.	0.	45.80	24196.	860712.
1961	4	204000.	15753.	3100.	149.04	69.27	79.77	206653.	827894.	10000.	0.	45.80	23415.	851310.
1961	5	236000.	4635.	3200.	149.01	69.91	79.10	227435.	936442.	10000.	0.	39.00	19685.	956126.
1961	6	262000.	2856.	3300.	149.11	70.31	78.80	251556.	997157.	10000.	0.	39.00	19050.	1016207.
1961	7	248000.	2062.	3300.	149.34	69.86	79.49	236762.	977747.	10000.	0.	39.00	19685.	997432.
1961	8	236000.	1155.	3300.	149.56	69.32	80.24	223855.	931648.	10000.	0.	39.00	19685.	951333.
1961	9	227000.	883.	3200.	149.68	69.10	80.58	214683.	867553.	10000.	0.	39.00	19050.	886602.
1961	10	225000.	758.	3200.	149.59	69.07	80.52	212558.	886946.	10000.	0.	39.00	19685.	906631.
1961	11	232000.	1060.	3200.	149.23	69.15	80.09	219860.	884297.	10000.	0.	45.80	23415.	907712.
1961	12	215000.	3543.	2900.	149.17	69.20	79.97	205643.	852930.	10000.	0.	45.80	24196.	877126.
1962	1	210000.	2097.	2500.	147.58	69.17	78.41	199597.	814204.	10000.	0.	45.80	24196.	838400.
1962	2	207000.	1347.	2500.	148.34	69.14	79.20	195847.	726644.	10000.	0.	45.80	21854.	748499.
1962	3	204000.	9114.	2800.	148.76	69.08	79.68	200314.	827676.	10000.	0.	45.80	24196.	851871.
1962	4	188000.	18189.	3100.	149.42	69.50	79.92	193089.	772737.	10000.	0.	45.80	23415.	796152.
1962	5	192000.	4792.	3200.	150.09	69.12	80.97	183592.	765626.	10000.	0.	39.00	19685.	785311.
1962	6	206000.	986.	3300.	150.01	68.59	81.42	193686.	787579.	10000.	0.	39.00	19050.	806629.
1962	7	210000.	856.	3300.	150.05	68.44	81.62	197556.	832381.	10000.	0.	39.00	19685.	852066.
1962	8	217000.	4557.	3300.	149.84	68.64	81.20	208257.	874764.	10000.	0.	39.00	19685.	894449.
1962	9	217000.	1331.	3200.	149.88	68.54	81.34	205131.	834802.	10000.	0.	39.00	19050.	853851.
1962	10	213000.	4203.	3200.	149.77	68.54	81.23	204003.	856842.	10000.	0.	39.00	19685.	876527.
1962	11	211000.	8800.	3200.	149.48	68.64	80.84	206600.	836616.	10000.	0.	45.80	23415.	860031.
1962	12	210000.	3720.	2900.	149.28	68.74	80.55	200820.	837203.	10000.	0.	45.80	24196.	861399.
1963	1	208000.	1414.	2500.	147.66	68.64	79.01	196914.	807573.	10000.	0.	45.80	24196.	831769.
1963	2	207000.	1414.	2500.	148.34	68.58	79.75	195914.	731013.	10000.	0.	45.80	21854.	752867.
1963	3	198000.	8289.	2800.	148.96	68.46	80.50	193489.	805081.	10000.	0.	45.80	24196.	829277.
1963	4	187000.	22825.	3100.	149.31	69.35	79.96	196725.	788309.	10000.	0.	45.80	23415.	811725.
1963	5	190000.	6757.	3200.	150.10	68.56	81.53	183557.	770213.	10000.	0.	39.00	19685.	789897.
1963	6	203000.	1265.	3300.	150.09	68.39	81.71	190965.	778479.	10000.	0.	39.00	19050.	797529.
1963	7	212000.	750.	3300.	150.00	68.39	81.61	199450.	840575.	10000.	0.	39.00	19685.	860260.
1963	8	217000.	1799.	3300.	149.91	68.49	81.42	205499.	864895.	10000.	0.	39.00	19685.	884580.
1963	9	216000.	2435.	3200.	149.88	68.59	81.29	205235.	834778.	10000.	0.	39.00	19050.	853828.
1963	10	211000.	1151.	3200.	149.90	68.41	81.49	198951.	837299.	10000.	0.	39.00	19685.	856984.
1963	11	205000.	6678.	3200.	149.68	68.49	81.19	198478.	805784.	10000.	0.	45.80	23415.	829199.
1963	12	210000.	4046.	2900.	149.28	69.01	80.26	201146.	836165.	10000.	0.	45.80	24196.	860361.

81-06-15-10:53

PLAN DE REGULATION DU SAINT-LAURENT ERIE 25 CAT1

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1964	1	210000.	5264.	2500.	147.49	68.95	78.54	202764.	828724.	10000.	0.	45.80	24196.	852920.
1964	2	207000.	2023.	2500.	148.32	68.77	79.55	196523.	758004.	10000.	0.	45.80	22635.	780639.
1964	3	193000	11825.	2800.	149.01	68.86	80.15	192025.	795740.	10000.	0.	45.80	24196.	819936.
1964	4	177000.	8957.	3100.	150.17	68.49	81.68	172857.	700241.	10000.	0.	45.80	23415.	723656.
1964	5	184000.	2950.	3200.	150.47	68.26	82.22	173750.	732165.	10000.	0.	39.00	19685.	751850.
1964	6	194000.	1166.	3300.	150.41	68.29	82.12	181866.	743012.	10000.	0.	39.00	19050.	762062.
1964	7	200000.	628.	3300.	150.37	68.16	82.21	187328.	792795.	10000.	0.	39.00	19685.	812480.
1964	8	206000.	711.	3300.	150.23	68.18	82.05	193411.	818129.	10000.	0.	39.00	19685.	837814.
1964	9	206000.	648.	3200.	150.19	68.13	82.06	193448.	791974.	10000.	0.	39.00	19050.	811024.
1964	10	205000.	660.	3200.	150.08	68.18	81.90	192460.	812636.	10000.	0.	39.00	19685.	832321.
1964	11	198000.	1453.	3200.	150.04	68.03	82.00	186253.	760881.	10000.	0.	45.80	23415.	784296.
1964	12	192000.	1665.	2900.	149.88	68.18	81.70	180765.	759237.	10000.	0.	45.80	24196.	783433.
1965	1	185000.	1669.	2500.	148.49	68.00	80.49	174169.	719646.	10000.	0.	45.80	24196.	743842.
1965	2	182000.	2628.	2500.	149.22	68.12	81.10	172128.	646179.	10000.	0.	45.80	21854.	668033.
1965	3	179000.	2475.	2800.	149.91	67.97	81.94	168675.	706828.	10000.	0.	45.80	24196.	731023.
1965	4	182000.	5539.	3100.	150.10	68.29	81.82	174439.	708265.	10000.	0.	45.80	23415.	731680.
1965	5	176000.	1893.	3200.	150.87	68.39	82.48	164693.	693243.	10000.	0.	39.00	19685.	712928
1965	6	189000.	644.	3300.	150.62	67.96	82.66	176344.	723609.	10000.	0.	39.00	19050.	742659.
1965	7	201000.	534.	3300.	150.34	68.08	82.26	188234.	797203.	10000.	0.	39.00	19685.	816888.
1965	8	205000.	1606.	3300.	150.23	68.34	81.90	193306.	816356.	10000.	0.	39.00	19685.	836041.
1965	9	202000.	1907.	3200.	150.27	68.51	81.76	190787.	778138.	10000.	0.	39.00	19050.	797187.
1965	10	205000.	3535.	3200.	150.00	69.37	80.62	195335.	814147.	10000.	0.	39.00	19685.	833832.
1965	11	212000.	9114.	3200.	149.45	69.35	80.10	207914.	835839.	10000.	0.	45.80	23415.	859254.
1965	12	231000.	6325.	2900.	148.85	70.21	78.63	224425.	920090.	10000.	0.	45.80	24196.	944286.
1966	1	220000.	2871.	2500.	147.29	69.72	77.57	210371.	853073.	10000.	0.	45.80	24196.	877268.
1966	2	230000.	3465.	2500.	147.73	69.97	77.76	220965.	811609.	10000.	0.	45.80	21854.	833464.
1966	3	242000.	10725.	2800.	148.04	71.08	76.97	239925.	968726.	10000.	0.	45.80	24196.	992921.
1966	4	240000.	6285.	3100.	148.57	70.41	78.16	233185.	921048.	10000.	0.	45.80	23415.	944463.
1966	5	220000.	3303.	3200.	149.32	69.60	79.72	210103.	869653.	10000.	0.	39.00	19685.	889338.
1966	6	216000.	1567.	3300.	149.72	69.20	80.52	204267.	824259.	10000.	0.	39.00	19050.	843308.
1966	7	220000.	679.	3300.	149.80	68.74	81.06	207379.	869745.	10000.	0.	39.00	19685.	889430.
1966	8	221000.	726.	3300.	149.84	68.84	81.00	208426.	873658.	10000.	0.	39.00	19685.	893342.
1966	9	221000.	840.	3200.	149.80	68.72	81.08	208640.	847101.	10000.	0.	39.00	19050.	866151.
1966	10	218000.	856.	3200.	149.73	68.69	81.04	205656.	862245.	10000.	0.	39.00	19685.	881930.
1966	11	209000.	1316.	3200.	149.71	68.79	80.92	197116.	797831.	10000.	0.	45.80	23415.	821246.
1966	12	210000.	2054.	2900.	149.33	70.15	79.17	199154.	818501.	10000.	0.	45.80	24196.	842697.
1967	1	210000.	2021.	2500.	147.58	69.35	78.23	199521.	812420.	10000.	0.	45.80	24196.	836615.
1967	2	207000.	1901.	2500.	148.32	69.48	78.85	196401.	726191.	10000.	0.	45.80	21854.	748045.
1967	3	204000.	5872.	2800.	148.85	68.92	79.93	197072.	815796.	10000.	0.	45.80	24196.	839992.
1967	4	191000.	18776.	3100.	149.31	69.91	79.41	196676.	783641.	10000.	0.	45.80	23415.	807057.
1967	5	202000.	4434.	3200.	149.77	69.78	79.99	193234.	799694.	10000.	0.	39.00	19685.	819379.
1967	6	223000.	2085.	3300.	149.54	69.75	79.79	211785.	849056.	10000.	0.	39.00	19050.	868106.
1967	7	246000.	1773.	3300.	149.36	69.88	79.48	234473.	968443.	10000.	0.	39.00	19685.	988128.
1967	8	266000.	1394.	3300.	149.37	69.91	79.46	254094.	1046337.	10000.	0.	39.00	19685.	1066021.
1967	9	263000.	1334.	3200.	149.34	69.86	79.49	251134.	1001610.	10000.	0.	39.00	19050.	1020659.
1967	10	265000.	3088.	3200.	149.23	70.31	78.92	254888.	1044553.	10000.	0.	39.00	19685.	1064237.
1967	11	276000.	5153.	3200.	149.04	71.37	77.67	267953.	1048541.	10000.	0.	45.80	23415.	1071955.
1967	12	276000.	6392.	2900.	148.73	71.69	77.04	269492.	1083743.	10000.	0.	45.80	24196.	1107938.

81-06-15-10:53

PLAN DE REGULATION DU SAINT-LAURENT ERIE 25 CAT)

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1968	1	244000.	2381.	2500.	146.93	70.52	76.40	230000.	924417.	13881.	0.	45.13	32615.	957032.
1968	2	254000.	3333.	2500.	147.52	70.71	76.82	235000.	886706.	19833.	0.	44.09	42094.	928801.
1968	3	240000.	14340.	2800.	148.04	70.77	77.27	240000.	971585.	11540.	0.	45.53	27569.	999154.
1968	4	260000.	6960.	3100.	148.46	71.15	77.31	253860.	993236.	10000.	0.	45.80	23415.	1016652.
1968	5	238000.	3211.	3200.	149.00	69.63	79.37	228011.	941151.	10000.	0.	39.00	19685.	960835.
1968	6	234000.	1174.	3300.	149.35	69.30	80.06	221874.	892119.	10000.	0.	39.00	19050.	911169.
1968	7	252000.	2353.	3300.	149.32	69.83	79.49	241053.	994957.	10000.	0.	39.00	19685.	1014642.
1968	8	262000.	1216.	3300.	149.36	69.86	79.51	249916.	1030378.	10000.	0.	39.00	19685.	1050062.
1968	9	269000.	1094.	3200.	149.35	70.01	79.35	256894.	1022161.	10000.	0.	39.00	19050.	1041211.
1968	10	260000.	1496.	3200.	149.23	69.75	79.47	248296.	1023664.	10000.	0.	39.00	19685.	1043349.
1968	11	253000.	6289.	3200.	149.01	69.75	79.26	246089.	980320.	10000.	0.	45.80	23415.	1003735.
1968	12	254000.	5702.	2900.	148.70	70.43	78.27	246802.	1007027.	10000.	0.	45.80	24196.	1031223.
1969	1	232000.	4074.	2500.	147.02	69.81	77.21	223574.	904810.	10000.	0.	45.80	24196.	929006.
1969	2	252000.	5592.	2500.	147.52	70.40	77.12	235000.	858416.	20092.	0.	44.05	41116.	899532.
1969	3	252000.	9227.	2800.	148.04	70.40	77.64	240000.	974696.	18427.	0.	44.34	42131.	1016827.
1969	4	264000.	23008.	3100.	148.47	71.58	76.89	273908.	1063536.	10000.	0.	45.80	23415.	1086951.
1969	5	274000.	5432.	3200.	148.84	71.55	77.29	266232.	1073635.	10000.	0.	39.00	19685.	1093319.
1969	6	288000.	4314.	3300.	149.12	71.12	78.00	279014.	1091607.	10000.	0.	39.00	19050.	1110656.
1969	7	297000.	1793.	3300.	149.30	70.92	78.38	285493.	1155492.	10000.	0.	39.00	19685.	1175176.
1969	8	293000.	1146.	3300.	149.38	70.77	78.62	280846.	1140518.	10000.	0.	39.00	19685.	1160202.
1969	9	276000.	1082.	3200.	149.37	70.21	79.16	263882.	1046608.	10000.	0.	39.00	19050.	1065657.
1969	10	254000.	1681.	3200.	149.24	69.68	79.56	242481.	1001364.	10000.	0.	39.00	19685.	1021049.
1969	11	247000.	5632.	3200.	149.04	69.98	79.05	239432.	952865.	10000.	0.	45.80	23415.	976281.
1969	12	240000.	2556.	2900.	148.79	70.25	78.54	229656.	940715.	10000.	0.	45.80	24196.	964911.
1970	1	226000.	1378.	2500.	147.19	69.75	77.44	214878.	870809.	10000.	0.	45.80	24196.	895004.
1970	2	228000.	2572.	2500.	147.78	69.72	78.06	218072.	803048.	10000.	0.	45.80	21854.	824902.
1970	3	220000.	9387.	2800.	148.36	69.54	78.83	216587.	889325.	10000.	0.	45.80	24196.	913521.
1970	4	219000.	25566.	3100.	148.59	70.11	78.48	231466.	916982.	10000.	0.	45.80	23415.	940398.
1970	5	226000.	5233.	3200.	149.16	70.29	78.87	218033.	895705.	10000.	0.	39.00	19685.	915390.
1970	6	218000.	1693.	3300.	149.66	69.48	80.19	206393.	830282.	10000.	0.	39.00	19050.	849332.
1970	7	234000.	2093.	3300.	149.51	69.70	79.80	222793.	923442.	10000.	0.	39.00	19685.	943127.
1970	8	252000.	1158.	3300.	149.40	69.91	79.49	239858.	990221.	10000.	0.	39.00	19685.	1009906.
1970	9	250000.	1893.	3200.	149.38	69.60	79.78	238693.	956242.	10000.	0.	39.00	19050.	975291.
1970	10	258000.	2796.	3200.	149.23	69.91	79.32	247596.	1019529.	10000.	0.	39.00	19685.	1039213.
1970	11	274000.	3547.	3200.	149.04	70.46	78.58	264347.	1043200.	10000.	0.	45.80	23415.	1066615.
1970	12	260000.	2516.	2900.	148.70	70.74	77.96	249616.	1015404.	10000.	0.	45.80	24196.	1039600.
1971	1	234000.	2463.	2500.	147.02	70.09	76.92	223963.	904112.	10000.	0.	45.80	24196.	928308.
1971	2	250000.	2286.	2500.	147.52	70.58	76.94	235000.	857042.	14786.	0.	44.97	31197.	888239.
1971	3	268000.	4871.	2800.	148.04	71.26	76.78	240000.	967490.	30071.	0.	42.31	64794.	1032284.
1971	4	274000.	32135.	3100.	148.47	72.18	76.28	288000.	1108511.	15035.	0.	44.93	33935.	1142446.
1971	5	289000.	9939.	3200.	148.84	72.26	76.58	285739.	1139914.	10000.	0.	39.00	19685.	1159598.
1971	6	286000.	1606.	3300.	149.12	70.77	78.35	274306.	1077742.	10000.	0.	39.00	19050.	1096791.
1971	7	272000.	940.	3300.	149.30	70.08	79.22	259640.	1065685.	10000.	0.	39.00	19685.	1085369.
1971	8	268000.	1096.	3300.	149.37	69.93	79.44	255796.	1052782.	10000.	0.	39.00	19685.	1072466.
1971	9	273000.	1602.	3200.	149.37	70.08	79.28	261402.	1038501.	10000	0.	39.00	19050.	1057551.
1971	10	268000.	935.	3200.	149.24	69.93	79.30	255735.	1051327.	10000.	0.	39.00	19685.	1071011.
1971	11	263000.	1060.	3200.	149.01	69.78	79.23	250860.	998313.	10000.	0.	45.80	23415.	1021728.
1971	12	248000.	4007.	2900.	148.72	70.18	78.54	239107.	978790.	10000.	0.	45.80	24196.	1002985.

81-06-15-10:53

PLAN DE REGULATION DU SAINT-LAURENT ERIE 25 CAT1

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1972	1	221000.	3406.	2500.	147.26	69.29	77.96	211906.	862675.	10000.	0.	45.80	24196.	886871.
1972	2	230000.	2003.	2500.	147.75	69.66	78.09	219503.	837531.	10000.	0.	45.80	22635.	860165.
1972	3	253000.	3626.	2800.	148.04	70.43	77.61	240000.	974436.	13826.	0.	45.14	32498.	1006934.
1972	4	274000.	31468.	3100.	148.47	71.88	76.58	288000.	1111135.	14368.	0.	45.04	32567.	1143702.
1972	5	291000.	9939.	3200.	148.84	72.84	76.00	287739.	1142019.	10000.	0.	39.00	19685.	1161703.
1972	6	302000.	7150.	3300.	149.12	71.73	77.39	288000.	1118208.	17850.	0.	39.00	33987.	1152194.
1972	7	311000.	6521.	3300.	149.30	71.68	77.42	288000.	1155741.	26221.	0.	39.00	51577.	1207317.
1972	8	310000.	7071.	3300.	149.38	71.60	77.78	288000.	1159067.	25771.	0.	39.00	50692.	1209759.
1972	9	309000	1378.	3200.	149.37	71.30	78.07	288000.	1124271.	15178.	0.	39.00	36514.	1160784.
1972	10	303000.	2824.	3200.	149.25	71.30	77.95	288000.	1160685.	14624.	0.	39.00	28777.	1189462.
1972	11	292000.	9075.	3200.	149.04	71.53	77.51	287875.	1118865.	10000.	0.	45.80	23415.	1142280.
1972	12	271000.	5735.	2900.	148.73	71.54	77.19	263835.	1063664.	10000.	0.	45.80	24196.	1087859.
1973	1	250000.	10546.	2500.	146.93	71.11	75.82	230000.	919784.	28046.	0.	42.66	61029.	980813.
1973	2	284000.	6751.	2500.	147.52	72.06	75.46	235000.	846334.	50000.	3251.	38.28	87027.	933361.
1973	3	298000.	23083.	2800.	148.04	73.76	74.29	240000.	947711.	50000.	28283.	33.92	85761.	1033472.
1973	4	324000.	12423.	3100.	148.47	73.07	75.39	288000.	1100989.	45323.	0.	39.66	87834.	1188822.
1973	5	337000.	8229.	3200.	148.84	73.00	75.85	288000.	1141629.	54029.	0.	39.00	106227.	1247856.
1973	6	350000.	8948.	3300.	149.12	72.69	76.43	288000.	1109786.	60000.	7648.	39.00	114153.	1223939.
1973	7	350000.	1953.	3300.	149.30	72.26	77.04	288000.	1152275.	60000.	653.	39.00	117958.	1270233.
1973	8	324000.	1941.	3300.	149.38	71.45	77.93	288000.	1160478.	34641.	0.	39.00	68128.	1228605.
1973	9	317000.	1861.	3200.	149.37	71.20	78.17	288000.	1125187.	27661.	0.	39.00	52653.	1177839.
1973	10	306000.	2676.	3200.	149.25	71.12	78.13	288000.	1162340.	17476.	0.	39.00	34385.	1196724.
1973	11	293000.	3890.	3200.	149.04	70.87	78.17	283690.	1109910.	10000.	0.	45.80	23415.	1133325.
1973	12	269000.	6990.	2900.	148.73	71.32	77.41	263090.	1062710.	10000.	0.	45.80	24196.	1086905.
1974	1	239000.	9800.	2500.	146.93	70.40	76.53	230000.	925403.	16300.	0.	44.71	37725.	963129.
1974	2	268000.	6990.	2500.	147.52	71.20	76.32	235000.	852519.	37490.	0.	41.02	70408.	922927.
1974	3	300000.	11270.	2800.	148.04	72.71	75.33	240000.	955820.	50000.	18470.	35.63	89664.	1045484.
1974	4	309000.	17210.	3100.	148.47	72.82	75.65	288000.	1103118.	35110.	0.	41.43	71458.	1174575.
1974	5	308000.	11070.	3200.	148.84	73.91	74.94	288000.	1133738.	27870.	0.	39.00	54818.	1188556.
1974	6	328000.	4100.	3300.	149.12	73.05	76.07	288000.	1106741.	40800.	0.	39.00	77644.	1184385.
1974	7	336000.	2480.	3300.	149.30	72.08	77.22	288000.	1153888.	47180.	0.	39.00	92770.	1246657.
1974	8	330000.	2980.	3300.	149.38	71.45	77.93	288000.	1160478.	41680.	0.	39.00	81962.	1242439.
1974	9	314000.	3050.	3200.	149.37	70.99	78.37	288000.	1127028.	25850.	0.	39.00	49207.	1176235.
1974	10	304000.	3620.	3200.	149.25	70.87	78.38	288000.	1164717.	16420.	0.	39.00	32308.	1197025.
1974	11	277000.	13400.	3200.	149.04	70.72	78.32	277200.	1087974.	10000.	0.	45.80	23415.	1111389.
1974	12	287000.	11170.	2900.	148.73	71.91	76.82	285270.	1140364.	10000.	0.	45.80	24196.	1164559.
1975	1	255000.	10810.	2500.	146.93	70.89	76.03	230000.	921481.	33310.	0.	41.75	70661.	992142.
1975	2	250000.	7225.	2500.	147.52	70.62	76.91	235000.	856814.	19725.	0.	44.11	40445.	897259.
1975	3	287000.	10680.	2800.	148.04	72.06	75.98	240000.	960969.	50000.	4880.	37.99	95599.	1056567.
1975	4	303000.	14280.	3100.	148.47	72.34	76.13	288000.	1107208.	26180.	0.	42.99	55639.	1162847.
1975	5	304000.	4250.	3200.	148.84	72.11	76.73	288000.	1149505.	17050.	0.	39.00	33547.	1183052.
1975	6	309000.	1130.	3300.	149.12	71.60	77.52	288000.	1119333.	18830.	0.	39.00	35852.	1155184.
1975	7	290000.	3680.	3300.	149.30	70.61	78.69	280380.	1139440.	10000.	0.	39.00	19685.	1159124.
1975	8	284000.	2740.	3300.	149.38	70.29	79.10	273440.	1117310.	10000.	0.	39.00	19685.	1136994.
1975	9	283000.	5210.	3200.	149.37	70.36	79.01	275010.	1086156.	10000.	0.	39.00	19050.	1105205.
1975	10	286000.	9730.	3200.	149.25	70.56	78.69	282530.	1147445.	10000.	0.	39.00	19685.	1167129.
1975	11	280000.	12670.	3200.	149.04	70.67	78.38	279470.	1096612.	10000.	0.	45.80	23415.	1120027.
1975	12	258000.	12240.	2900.	148.72	71.14	77.58	257340.	1042133.	10000.	0.	45.80	24196.	1066329.

81-06-15-10:53

PLAN DE REGULATION DU SAINT-LAURENT ERIE 25 CAT1

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
1976	1	245000.	6200.	2500.	146.93	70.95	75.97	230000.	920995.	18700.	0.	44.29	42690.	963685.
1976	2	258000.	12840.	2500.	147.52	71.35	76.17	235000.	881809.	33340.	0.	41.74	66152.	947961.
1976	3	289000.	19310.	2800.	148.04	73.02	75.03	240000.	953406.	50000.	15510.	36.14	90904.	1044310.
1976	4	306000.	13210.	3100.	148.47	73.98	74.48	288000.	1093454.	28110.	0.	42.65	59177.	1152630.
1976	5	328000.	11460.	3200.	148.84	73.43	75.42	288000.	1137876.	48260.	0.	39.00	94892.	1232768.
1976	6	348000.	2850.	3300.	149.12	72.51	76.61	288000.	1111321.	59550.	0.	39.00	113298.	1224618.
1976	7	350000.	5520.	3300.	149.30	72.24	77.06	288000.	1152505.	60000.	4220.	39.00	117958.	1270463.
1976	8	326000.	9910.	3300.	149.38	71.48	77.91	288000.	1160242.	44610.	0.	39.00	87720.	1247961.
1976	9	309000.	10770.	3200.	149.37	71.05	78.32	288000.	1126567.	28570.	0.	39.00	54382.	1180948.
1976	10	302000.	9920.	3200.	149.25	71.10	78.16	288000.	1162577.	20720.	0.	39.00	40762.	1203339.
1976	11	293000.	9240.	3200.	149.04	70.82	78.22	288000.	1125679.	11040.	0.	45.62	25625.	1151303.
1976	12	230000.	5150.	2900.	148.88	70.18	78.69	222250.	911642.	10000.	0.	45.80	24196.	935838.

81-06-15-10:54

PLAN DE REGULATION DU SAINT-LAURENT ERIE 25 CAT1

AN	MOIS	APPORTS CORNWALL	APPORTS ST-FRANC.	PERTES CHENEAUX	BEAUHARNOIS AMONT	BEAUHARNOIS AVAL	BEAUHARNOIS CHUTE	BEAUHARNOIS TURBINE	BEAUHARNOIS ENERGIE	LES CEDRES TURBINE	LES CEDRES DEVERSE	LES CEDRES CHUTE	LES CEDRES ENERGIE	TOTAL ENERGIE
****	1	216403.	3183.	2500.	147.41	69.18	78.24	206304.	840983.	10782.	0.	45.67	25803.	866785.
****	2	228234.	2970.	2500.	147.91	69.44	78.47	214994.	801063.	13668.	42.	45.16	28878.	829941.
****	3	233805.	10583.	2800.	148.34	69.96	78.38	222910.	910429.	17742.	935.	44.29	38693.	949122.
****	4	240000.	16130.	3100.	148.75	70.68	78.06	241083.	946465.	11946.	0.	45.46	27218.	973683.
****	5	247649.	5642.	3200.	149.19	70.93	78.26	238292.	967642.	11799.	0.	39.00	23222.	990864.
****	6	252961.	2616.	3300.	149.40	70.32	79.08	239784.	949706.	12393.	99.	39.00	23602.	973308.
****	7	256831.	1637.	3300.	149.51	69.88	79.62	242442.	997613.	12663.	63.	39.00	24920.	1022533.
****	8	258662.	1440.	3300.	149.55	69.66	79.88	244644.	1009136.	12158.	0.	39.00	23927.	1033063.
****	9	255623.	1394.	3200.	149.52	69.53	80.00	242844.	971033.	10973.	0.	39.00	20901.	991933.
****	10	247883.	2286.	3200.	149.44	69.46	79.98	236520.	978103.	10449.	0.	39.00	20568.	998671.
****	11	240844.	3784.	3200.	149.27	69.48	79.79	231414.	924801.	10014.	0.	45.80	23444.	948246.
****	12	231312.	3461.	2900.	149.01	69.67	79.34	221873.	913529.	10000.	0.	45.80	24195.	937724.
*********		242517.	4594.	3042.	148.94	69.85	79.09	231925.	934208.	12049.	95.	42.18	25447.	959656.

MOYENNE MENSUELLE ET ANNUELLE DES 77 ANNEES ETUDIEES

81-06-15-10:54

BASE 1977 AVEC DEV.

BEAUHARNOIS + LES CEDRES

MOYENNE DE 77 ANS

	K W	7.568 MILLS
JANVIER	1165471.	6562286.
FEVRIER	1223312.	6279681.
MARS	1275912.	7184119.
AVRIL	1353857.	7377098.
MAI	1330083.	7489154.
JUIN	1349585.	7353826.
JUILLET	1372484.	7727890.
AOUT	1384438.	7795195.
SEPTEMBRE	1375203.	7493423.
OCTOBRE	1342520.	7559172.
NOVEMBRE	1314165.	7160820.
DECEMBRE	1258097.	7083820.
ANNUEL	1312093.	7253739.

81-06-15-10:54

ERIE 25 CAT1

BEAUHARNOIS + LES CEDRES

MOYENNE DE 77 ANS

	K W	7.568 MILLS
JANVIER	1165035.	6559832.
FEVRIER	1223470.	6280990.
MARS	1275704.	7182958.
AVRIL	1352340.	7368835.
MAI	1331807.	7498855.
JUIN	1351817.	7365993.
JUILLET	1374373.	7738529.
AOUT	1388526.	7818222.
SEPTEMBRE	1377687.	7506950.
OCTOBRE	1342300.	7557944.
NOVEMBRE	1317009.	7176324.
DECEMBRE	1260383.	7096696.
ANNUEL	1313370.	7260799.

81-06-15-10:54

ERIE 25 CAT1

BEAUHARNOIS + LES CEDRES

PUISSANCE MOYENNE EN KILOWATT

	BASE 1977 AVEC DEV.	ERIE 25 CAT1	DIFFERENCE
JANVIER	1165471.	1165035.	-436.
FEVRIER	1223312.	1223470.	158.
MARS	1275912.	1275704.	-208.
AVRIL	1353857.	1352340.	-1517.
MAI	1330083.	1331807.	1724.
JUIN	1349585.	1351817.	2232.
JUILLET	1372484.	1374373.	1889.
AOUT	1384438.	1388526.	4088.
SEPTEMBRE	1375203.	1377687.	2484.
OCTOBRE	1342520.	1342300.	-220.
NOVEMBRE	1314165.	1317009.	2844.
DECEMBRE	1258097.	1260383.	2286.
MOYENNE	1312093.	1313370.	1277.

1277. KW @ $ 7.568 LE MW.H = $ 84718./AN

81-06-15-10:54

ANNEX D - COMPUTER PROGRAMS

PART 3 - NEW YORK STATE SYSTEM

INTERNATIONAL LAKE ERIE REGULATION STUDY

ADDENDUM D - POWER

Determination of Power Output from New York State System

Niagara River Power Plants

Robert Moses Niagara Power Plant and
Lewiston Pumping Generating Station

Outline of Lake Erie Regulation Study
Computations for Niagara Power Evaluation

Energy

1. Lake Erie Outflow exceedence frequencies are received from Ontario Hydro for base case and for each run to be evaluated.

2. Adjust outflows to determine Niagara River Flow into Grass Island Pool (Table E-4 Pg 28).

3. Observe that for essentially all of the base case, Niagara entitlement can be diverted by US side; there are no residual losses in the base case.

4. Compare various plans with base case. Record exceedences at which high flows are higher and by how much. (Niagara diversion limit corresponds to a Niagara Flow of about 255 TCFS.)

5. Convert incremental flows - %'s to MW hrs (energy). Note here that only months of April, May, June, July and August were affected measurably by plans considered.

6. Convert MWH to economic value using the unit price of energy. (In this study, it is $110.6/MWH.)

Capacity

The capacity situation at Niagara is unique in that water can be stored in the Lewiston Reservoir and be available for generation during times of peak need. Normally peak output can be derived from Niagara anytime that diversion is about 55,000 cfs or more and sufficient water exists in the reservoir for the length of peak desired. Of course river flows must also be sufficient so that the reservoir can be pumped back in off-peak hours and on weekends so that the reservoir is full at the beginning of each week.

With the level at which production at Niagara is committed based on natural flows, the existing capacity at Niagara can be fully utilized any time the river is above about 185 TCFS during non-tourist periods and above about 210 TCFS during the tourist season.

With the above in mind, the computations* proceeded as follows:

1. The exceedence frequencies for each plan were compared with the base case for the aforementioned flows. These were taken at 10% intervals beginning with the 95% exceedence flow.

2. Any differences in flow were converted to an average monthly figure, divided by 2 to give the US share, and converted to megawatts at the rate of 22 MW/1000 cfs.

3. This yielded a change in capacity in units of megawatt-months, which was divided by 12 to give MW years.

4. This was then converted to economic value at the rate of 1 MW Yr. = $70,000.

*Note that no additional computer runs were made for US Niagara Calculations. The required information was extracted from the computer runs prepared by Ontario Hydro based on hydrologic information provided by the Hydrology Sub-Committee.

St. Lawrence River Power Plant

Robert Moses Power Dam

Peak and energy outputs were assumed to be the same as that of the Robert H. Saunders Generating Station and was computed by Ontario Hydro as described in Section 1.

ANNEX D - COMPUTER PROGRAMS

PART 4 - UPPER MICHIGAN SYSTEM

DOCUMENTATION OF THE

WEINRUB POWER PROGRAM

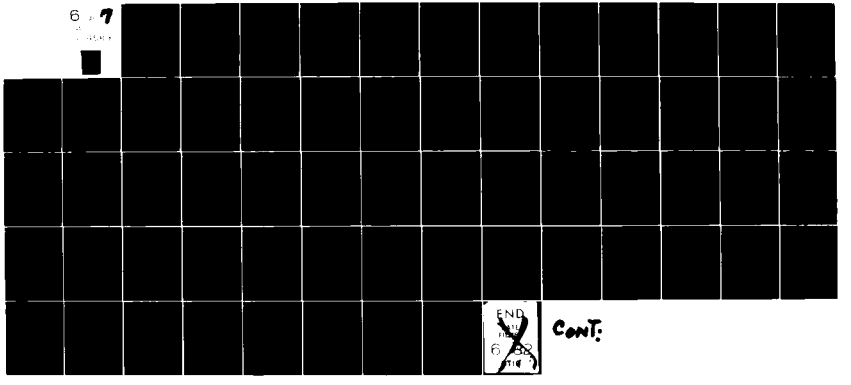
TABLE OF CONTENTS

		PAGE
I.	PURPOSE AND INPUT	2
II.	DEFINITION OF TERMS	5
III.	SAMPLE COMPUTATION	7
	A. Basic Data	7
	B. Head Losses	8
	C. Flow Distribution	17
	1. Canadian Flow	17
	a. Forebay Level	18
	b. Tailrace Level	19
	c. Head at Great Lakes Power	25
	2. U.S. Flow	27
	D. Edison Sault Head Losses	28
	E. Head At U.S. Power Plants	28
	F. Computation Of Power Output	29
	1. Edison Sault	29
	2. U.S. Government Plant	30
	G. Power Generation Costs	33

AD-A114 589 INTERNATIONAL LAKE ERIE REGULATION STUDY BOARD F/G 13/2
LAKE ERIE WATER LEVEL STUDY. APPENDIX E. POWER. ANNEX D. COMPUT--ETC(U)
JUL 81

UNCLASSIFIED NL

6 of 7



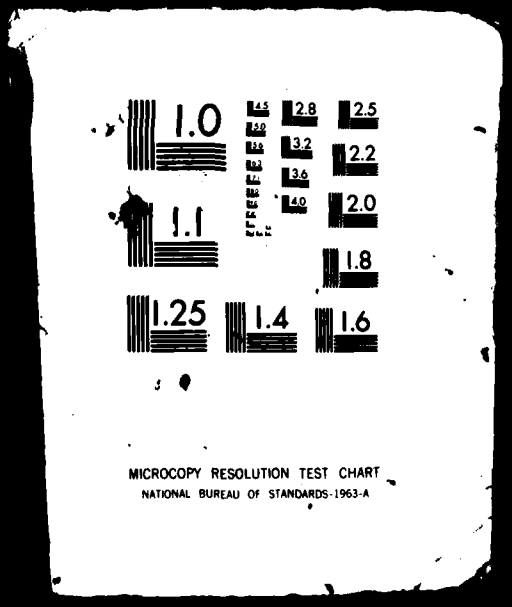
END
DATE
FILMED
6 82
DTIC

CONT.

6 OF 7

AD

A114589



I. PURPOSE AND INPUT

The Weinrub Power Program is designed to compute the total cost of power generation at both the Edison Sault Power Plant and at the U.S. Government Power Plant in Sault Ste. Marie, Mich.

The input data for the program are as listed below:

INPUT CARDS IN THE FOLLOWING ORDER

READ 200 - PARAMETER CARD - 1 CARD

COL	FMT	VAR	DESCRIPTION
01-05	I5	IYRS	NUMBER OF YEARS OF DATA
06-10	F5.0	CON	CONSTANT IN FEET TO CHANGE CONDITIONS ON MICHIGAN-HURON (1933 OR 1968).
11-15	I5	IFSQ	0 IF THE PROGRAM COMPUTES THE MINIMUM FLOW THRU THE STRUCTURES. 1 IF THE MINIMUM FLOW IS TO BE READ IN.
16-20	F5.0	DLLO	LONG LAKE OGOKI DIVERSION IN TCFS
21-25	F5.0	CMAX	MAXIMUM DIVERSION OF FLOW FOR CANADIAN POWER
26-30	F5.0	QMAX	MAXIMUM SUPERIOR FLOW
31-35	F5.0	QGI	DIVERSION OF FLOW FOR US GOVERNMENT POWER PLANT

36-40	I5	IFEPO	1 FOR PRINT OUT OF ALL VALUES COMPUTED
			0 OTHERWISE
41-45	I5	IFCSC	1 FOR CALCULATING CANADIAN DIVERSION
			0 OTHERWISE

READ 118 - PARAMETER CARD - 1 CARD

COL	FMT	VAR	DESCRIPTION
01-72	12F6.2	QM	MONTHLY FLOW LOSS FOR NAVIGATION

READ 100 - DATA CARDS - IN THE ORDER SUPERIOR MONTHLY MEAN LEVELS
MICHIGAN-HURON MONTHLY MEAN LEVELS,
SUPERIOR MONTHLY MEAN OUTFLOWS, AND
IF NECESSARY, THE FORCED MINIMUM FLOWS.

COL	FMT	VAR	DESCRIPTION
01-72	12F6.0	ELS	SUPERIOR MONTHLY MEAN LEVELS
01-72	12F6.0	ELH	MICHIGAN-HURON MONTHLY MEAN LEVELS
01-72	12F6.0	QO	SUPERIOR MONTHLY MEAN OUTFLOWS
01-72	12F6.0	QQS	FORCED MINIMUM FLOWS

Also included as input are the following:

```
DATA AMON / 744., 678.0, 744., 720., 744., 720., 2*744., 720., 744.,
720., 744./
```

(This data converts kilowatts to killowatt-hours)

ENERGY RATE

ER = 3.36

DEMAND RATE

DR = 28.33

This data is used to compute the distribution of flow and the head available at each power plant. The flow and head are employed in the computation of power output at each of the two plants, and then power costs are computed by use of the energy rate and the demand rate.

II. DEFINITION OF TERMS

HLAKES - H(1) - Head available between Lake Superior and Lake Michigan-Huron.

HSWP - H(2) - Head loss from Lake Superior to Southeast Pier gauge (SWP).

HPLANT - H(3) - Head loss from SWP to Edison Sault Power Plant.

HURON - H(4) - Head loss from U.S. Slip gauge (USS) to Lake Mich-Huron.

HEDS - H(5) - Head available for power at Edison Sault Power Plant.

HGOVT - H(6) - Head available for power at U.S. Government Plant.

ELS - Elevation of Lake Superior (monthly mean).

ELH - Elevation of Lake Michigan-Huron (monthly mean).

ELSWP - Elevation at Southwest Pier gauge.

ELUSS - Elevation at U.S. Slip gauge.

ELTRG - Elevation of tailrace of U.S. Government Power Plant.

ELTRES - Elevation of tailrace of Edison Sault Power Plant.

QT - Total outflow from Lake Superior.

QU - Flow available for U.S. power generation.

QC - Flow available for Canadian power generation.

QM - Flow required for navigation in U.S. Locks.

QG - Flow available for power generation at U.S. Govt. Power Plant.

QS - Flow available for power generation at Edison Sault Power Plant.

ELPLANT - Elevation of headrace at Edison Sault Power Plant.

ELO11 - Elevation at CHS gauge O11 upstream of Great Lakes Power Plant.

FH - Elevation of forebay of Great Lakes Power Plant.

ELO12 - Elevation at CHS gauge O12 downstream of Great Lakes Power Plant.

FT - Elevation of tailrace of Great Lakes Power Plant.

CHEAD - Head available at Great Lakes Power Plant.

CQMAX - Maximum possible flow through Great Lakes Power based on plant performance curve.

CQMIN - Minimum possible flow through Great Lakes Power based on plant performance curve.

PGLP - Power output (kw) at Great Lakes Power.

PSE - Power output (kw) at Edison Sault.

PGV - Power output (kw) at U.S. Government Plant.

TPSE - Power output (kw-hrs.) at Edison Sault.

TPGV - Power output (kw-hrs.) at U.S. Government Plant.

ENGCOS - Energy cost of power generation.

CAPCOS - Capacity cost of power generation.

TOTCOS - Energy plus capacity cost.

III. SAMPLE COMPUTATION

A. Basic Data

In order to describe the procedures employed in the Weinrub Power Program a sample computation has been performed using a random set of data from the Plan 1977 Base Case. The data used is for June, 1948:

Lake Superior outflow--75.74 tcfs

Lake Superior stage--600.46 ft.

Lakes Michigan-Huron--578.87 ft.

Several constants used in the computational procedures will change depending on the period that the data applies to.

For January to March period;

A = 1.93

B = 569.56

AN = .2

BN = 135.11

CN = 1142.14

DN .2926

For April to December period:

A = 1.605

B = 567.29

AN = .4

BN = 187.07

CN = 1138.2

DN = .2978

B. Head Losses

The computation begins by computing the forebay level of the Great Lakes Power Plant. This is obtained by computing the head loss from Lake Superior to CHS gauge 011 and subtracting this loss from the Lake Superior level.

$$ELO11\ (I,J) = ELS\ (I,J) - (Q/BN)^2$$

$$ELO11 = 600.46 - (75.74/187.07)^2$$

$$ELO11 = 600.30$$

The head loss from Lake Superior to Lakes Michigan-Huron,

$$H(1) = ELS\ (I,J) - ELH\ (I,J)$$

$$H(1) = 600.46 - 578.87$$

$$H(1) = 21.59 = HLAKES$$

The head loss from Lake Superior to Southwest Pier gauge, located near the entrance to the Edison Sault Power Canal,

$$H(2) = 37143E - 7 \times Q - .06572$$

$$H(2) = (.0037143 \times 75.74) - .06572$$

$$H(2) = .\underline{22} = HSWP$$

The elevation at the SWP gauge is the elevation of Lake Superior less the head loss from Lake Superior to SWP gauge,

$$ELSWP = ELS - H(2)$$

$$ELSWP = 600.46 - .22 = \underline{600.24}$$

At this point in the program, the Subroutine Head is called,

Call Head [ELH (I,J), H(4)]

This subroutine calculates H(4) by the method of successive approximation. It is set up to compute H(4) 19 successive times, or until accuracy to the nearest 0.0005 is obtained, each time substituting in the previously calculated value of H(4), so as to reduce the difference between two successive values of H(4) to an insignificant amount; thereby an accurate value of H(4) is arrived at.

Subroutine Head (Y, Y1) [Where Y = ELH and Y1 = H(4)]

Common A, B, AN, Y2, Q

$$Y2 = CM/(X - B)^{BM} + .09,$$

Where Y2 = Y1 = H(4)

X = Y1 + Y = U.S. Slip gauge elevation

B = 567.29

BM = 1.5/AN = 1.5/.4 = 3.75

and $CM = (Q/A)^{AM}$

Where Q = 75.74

A = 1.605

$$AM = 1./AN = 1./.4 = 2.5$$

Thus, $$CM = (75.74/1.605)^{2.5}$$

$$CM = 15297.68311$$

Next, a Do Loop is begun which will run through the following sequence of equations 19 times:

```
DO 5 I = 1,19
Y1 = Y2
X = Y1 + Y
```

In this example the initial value of Y1 is 1 and Y = 578.87

$$X = 1 + 578.87 = 579.87$$

These values are then substituted into the equation for head loss from U.S. Slip to Lake Mich-Huron:

(1) $$Y2 = CM/(X-B)^{BM} + .09$$

$$Y2 = 15297.68311/(579.87 - 567.29)^{3.75} + .09$$

$$Y2 = 1.24033$$

$$Y2 = (Y1 + Y2)/2$$

$$Y2 = (1 + 1.24033)/2$$

$$Y2 = 1.120165$$

If the difference between the absolute value of Y1 and the new Y2, and .0005, is negative, this is the actual value of Y2; if not, recalculate Y2.

IF [ABS (Y2 - Y1) - .0005] 10,5,5

1.120165 - 1 - .0005 = .119665 (positive)

5 Continue

10 Y1 = Y2

This new value of Y1 is then substituted in the equation X = Y1 + Y to attain a new value of X which is substituted in the equation for head loss.

(2) Y1 = Y2

X = Y1 + Y

X = 1.20165 + 578.87

X = 580.07165

$$Y2 = 15297.68311/(580.07165 - 567.29)^{3.75} + .09$$

Y2 = 1.173739

Y2 = (Y1 + Y2)/2

Y2 = (1.20165 + 1.173739)/2 = 1.187695

ABS (Y2 - Y1) - .0005 = (1.187695 - 1.120165) - .0005

= .06753 - .0005

= .06703 (positive)

CONTINUE

(3) Y1 = Y2

X = Y1 + Y

X = 1.187695 + 578.87

X = 580.057695

$Y2 = 15297.68311/(580.057695 - 567.29)^{3.75} + .09$

Y2 = 1.178188

Y2 = (Y1 + Y2)/2

Y2 = (1.187695 + 1.178188)/2

Y2 = 1.182942

ABS (Y2 - Y1) - .0005 = (1.182942 - 1.187695) - .0005

= .004753 - .0005

= .004253 (positive)

CONTINUE

(4) Y1 = Y2

X = Y1 + Y

X = 1.182942 + 578.87

X = 580.052942

$Y2 = 15297.68311/(580.052942 - 567.29)^{3.75} + .09$

$Y2 = 1.179708$

$Y2 = (Y1 + Y2)/2$

$Y2 = (1.182942 + 1.179708)/2$

$Y2 = 1.181325$

$ABS\ (Y2 - Y1) - .0005 = (1.181325 - 1.182942) - .0005$

$= .001617 - .0005$

$= .001117$ (positive)

CONTINUE

(5) $Y1 = Y2$

$X = Y1 + Y$

$X = 1.181325 + 578.87$

$X = 580.051325$

$Y2 = 15297.68311/(580.051325 - 567.29)^{3.75} + .09$

$Y2 = 1.180226$

$Y2 = (Y1 + Y2)/2$

$Y2 = (1.181325 + 1.180226)/2$

$Y2 = 1.180776$

ABS (Y2 - Y1) - .0005 = (1.180776 - 1.181325) - .0005

= .000549 - .0005

= .000049 (positive)

CONTINUE

(6) Y1 = Y2

X = Y1 + Y

X = 1.180776 + 578.87

X = 580.050776

$Y2 = 15297.68311/(580.050776 - 567.29)^{3.75} + .09$

Y2 = 1.180402

Y2 = (Y1 + Y2)/2

Y2 = (1.180776 + 1.180402)/2

Y2 = 1.180589

ABS (Y2 - Y1) - .0005 = (1.180589 - 1.180776) - .0005

= .000187 - .0005

= - .000313 (negitive)

Y1 = Y2 = H(4) = <u>1.180589</u>

RETURN TO MAIN PROGRAM

H(4) = <u>1.18</u>

Huron = H(4) = 1.18

The next step in the program is to compute the elevation at U.S. Slip gauge, which is,

$$ELUSS = ELH + H(4)$$

$$ELUSS = 578.87 + 1.18 = \underline{580.05}$$

The elevation of the tailrace of the U.S. Govt. plant is computed by adding the tailrace losses to the U.S. Slip gauge elevation. As referenced in "Appendix F - Power",[1] the river losses and head and tailrace losses were assumed constant at 0.6 ft. For this particular case, the assumption is made that the tailrace losses alone are 0.6 ft.

$$ELTRG = ELUSS + .6$$

$$ELTRG = 580.05 + .6 = \underline{580.65}$$

The elevation of the tailrace of the Edison Sault Plant is computed by adding the tailrace losses to the U.S. Slip gauge elevation. The tailrace losses for the Edison Sault Plant are assumed to be 0.2 ft.

$$ELTRES = ELUSS + .2$$

$$ELTRES = 580.05 + .2 = 580.25$$

[1] Report to the International Joint Commission by the International Great Lakes Levels Board, 7 December 1973.

C. Flow Distribution

The next step in the program involves the computation of the flow from Lake Superior which is available for U.S. power generation. The total Lake Superior flow for this example is 75.74 TCFS. The flow available for U.S. and Canadian power generation is computed by deducting from the total Lake Superior flow the flow required for navigation in the locks and the flow through the compensating works.

$$QT = Q - QM - 2.$$

The flow required for navigation (QM) varies for each month, and in this case is 1.35 TCFS. The flow through the compensating works is 2 TCFS; this value is based on 1/2 gate open at the average Lake Superior stage.

Thus,

$$QT = 75.74 - 1.35 - 2$$

$$QT = 72.39$$

1. Canadian Flow

The flow available for Canadian power generation is as follows:

$$QC = (Q - QM - 2)/2$$

$$QC = 72.39/2 = 36.2 \text{ TCFS}$$

In order to determine the actual Canadian Power diversion, it is first necessary to compute the head available at Great Lakes Power (Canadian Power Plant). The flow available (QC) at the computed head (H) is compared with the maximum and minimum flows, which are derived from the plant performance curves. If the limitations are exceeded, QC is increased/decreased incrementally and the head is recalculated using the new QC. (All equations used were developed by Ontario Hydro in co-operation with the Great Lakes Power Corporation). The head available is the difference between the forebay level and the tailrace level. The forebay level of Great Lakes Power is calculated by computing the head loss from Lake Superior to CHS gauge 011 (to obtain CHS011 level) and the head loss from CHS gauge 011 to the plant forebay (to obtain forebay level).

CHS011 Level:

for April to December,

(as previously calculated)

EL011 = 600.30

Forebay Level

$$FH(I,J) = EL011 - .0211QC^{2.2826} (EL011 - 574.147)^{-6.06}$$

$$FH = 600.30 - .0211 (36200)^{2.2826} (600.30 - 574.147)^{-6.06}$$

$$FH = 600.30 - 1.38$$

$$FH = 598.92$$

Tailrace Level

The tailrace level is calculated by computing the head loss from Lakes Michigan-Huron to CHS gauge 012 (to obtain CHS 012 level) and the head loss from CHS gauge 012 to the Great Lakes Power tailrace (to obtain tailrace level). At this point in the program, the Subroutine Tail is called,

Call Tail [ELH(I,J), QC(I,J), EL012(I,J)]

This subroutine calculates EL012 by the method of successive approximation. It is set up to compute EL012 19 successive times or until an accuracy to the nearest .00025 is obtained, each time substituting in the previously calculated value of EL012 so as to reduce the difference between two successive values of EL012 to insignificant amount; thereby an accurate value of EL012 is obtained. For this example, the equations used apply to the April to December period.

```
Subroutine Tail (Y, QC, EL)
Common A, B, AN, C, Q, CN, DN

EL = Y
CM = DN * QC
CM = CM * CM
```

For this example,

Y = 578.87 (Lakes Michigan-Huron stage)

QC = 36.2

Thus, CM = 10.78 and CM^2 = 116.22

These values are then substituted into the equation for EL012 level:

```
Do I = 1,19
  Y2 = Y + CM/(Y + EL - CN)**2
(1)  Y2 = 578.87 + 116.22/(578.87 + 578.87 - 1138.2)**2
  Y2 = 579.174391
```

The average of Lakes Michigan-Huron stage and the initial EL012 level is computed,

```
EL = (EL + Y2)/2
EL = (578.87 + 579.174391)/2
EL = 579.022196
```

If the difference between the absolute value of Y2 and EL, and .00025 is negative, that value of EL (EL012) is the actual value; if not, recalculate EL.

IF [ABS(Y2 - EL) - 0.00025] 10, 5, 5

Y2 - EL - .00025 = (579.174391 - 579.022196) - .00025

= .152195 - .00025 = .151945 (positive)

5 CONTINUE

10 RETURN

(2) $Y2 = 578.87 + 116.22/(578.87 + 579.022196 - 1138.2)^2$

Y2 = 579.169652

EL = (EL + Y2)/2

EL = (579.022196 + 579.169652)/2

EL = 579.095924

(Y2 - EL) - .00025 = (579.169652 - 579.095924) - .00025

= .073728 - 0.00025 = .073478 (positive)

CONTINUE

(3) $Y2 = 578.87 + (116.22)/(578.87 + 579.095924 - 1138.2)^2$

Y2 = 579.167421

EL = (EL + Y2)/2

EL = (579.095924 + 579.167421)/2

EL = 579.131673

(Y2 - EL) - .00025 = (579.167421 - 579.131673) - .00025

= (.035748) - .00025 = .03549 (positive)

CONTINUE

(4) $Y2 = 578.87 + (116.22)/(578.87 + 579.131673 - 1138.2)^2$

Y2 = 579.166348

EL = (EL + Y2)/2

EL = (579.131673 + 579.166348)/2 = 579.149011

(Y2 - EL) - .00025 = (579.166348 - 579.149011) - .00025

= .017337 - .00025 = .017087 (positive)

CONTINUE

(5) $Y2 = 578.87 + (116.22)/(578.87 + 579.149011 - 1138.2)^2$

Y2 = 579.165830

EL = (EL + Y2)/2

EL = (579.149011 + 579.165830)/2

EL = 579.157421

(Y2 - EL) - .00025 = (579.165830 - 579.157421) - .00025

= .008409 - .00025 = .008159 (positive)

CONTINUE

(6) $Y2 = 578.87 + (116.22)/(578.87 + 579.157421 - 1138.2)^2$

$Y2 = 579.165579$

$EL = (EL + Y2)/2$

$EL = (579.157421 + 579.165579)/2$

$EL = 579.161500$

$(Y2 - EL) - .00025 = (579.165579 - 579.161500) - .00025$

$= .0040079 - .00025 = .003829$

CONTINUE

(7) $Y2 = 578.87 + (116.2)/(578.87 + 579.161500 - 1138.2)^2$

$Y2 = 578.87 + .295457$

$Y2 = 579.165457$

$EL = (EL + Y2)/2$

$EL = (579.161500 + 579.165457)/2$

$EL = 579.163479$

$(Y2 - EL) - .00025 = (579.165457 - 579.163479) - .00025$

$= .001978 - .00025 = .001728$ (positive)

CONTINUE

(8) $Y2 = 578.87 + (116.2)/(578.87 + 579.163479 - 1138.2)^2$

$Y2 = 578.87 + .295399$

$Y2 = 579.165399$

$EL = (EL + Y2)/2$

$EL = (579.163479 + 579.165399)/2$

$EL = 579.164439$

$(Y2 - EL) - .00025 = (579.165399 - 579.164439) - .00025$

$= .00096 - .00025 = .00071$ (positive)

CONTINUE

(9) $Y2 = 578.87 + (116.2)/(578.87 + 579.164439 - 1138.2)^2$

$Y2 = 579.165370$

$EL = (EL + Y2)/2$

$EL = (579.164439 + 579.165370)/2$

$EL = 579.164905$

$(Y2 - EL) - .00025 = (579.165370 - 579.164905) - .00025$

$= .000465 - .00025 = .000215$ (positive)

CONTINUE

(10) $Y2 = 578.87 + (116.2)/(578.87 + 579.164905 - 1138.2)^2$

$Y2 = 579.165370$

EL = (EL + Y2)/2

EL = (579.164905 + 579.165370)/2

EL = 579.165138

(Y2 - EL) - .00025 = (579.165370 - 579.165138) - .00025

= .000232 - .00025 = - .000018

EL = EL012 = 579.165138

RETURN TO MAIN PROGRAM

Once the actual value of EL012 has been computed the tailrace level (FT) is computed.

$$FT(I,J) = EL012 + 1.2394 \times 10^{-11} \times QC^2 (590.551 - EL012)^{1.39}$$

$$FT = 579.165138 + 1.2394 \times 10^{-11} \times 36200^2 (590.551 - 579.165370)^{1.39}$$

FT = 579.165138 + .477491

FT = 579.642629

Head at Great Lakes Power

The head at the Great Lakes Power Plant is calculated as the forebay level minus the tailrace level,

CHEAD (I,J) = FH (I,J) - FT (I,J)

CHEAD = 598.92 - 579.642629

CHEAD = 19.28

The flow available (QC) for power at Great Lakes Power is 36.2 TCFS. The program now determines if this flow is within the maximum (CMAX) and minimum (CMIN) limitations of the plant performance curve.

CQMAX = CHEAD (I,J) + 17.6

CQMAX = 19.28 + 17.6

CQMAX = 36.88 TCFS

IF (CQMAX + 1 - QC (I,J)) 72, 71, 71

QC is within the maximum limitation.

Thus 36.2 TCFS is the Canadian Power diversion.

CQMIN = (.85 x CHEAD) + 13.9

CQMIN = (.85 x 19.28) + 13.9

CQMIN = 30.29 TCFS

IF(~~CQMIN~~ QC(I,J) + 1 - ~~QC (I,J)~~ CQMIN) 73, 74, 74

QC is within the minimum limitation.

Thus 36.2 TCFS is the Canadian Power diversion.

If QC had exceeded the limitations, a useable value of discharge would be determined by averaging QC with CQMAX/CQMIN and recalculating head until a value of QC within the limitations is obtained.

Once QC and CHEAD are determined, the power at Great Lakes Power is computed,

PGLP (I,J) = .072691 x QC (I,J) x CHEAD (I,J)

PGLP = .072691 x 36.2 x 19.28

PGLP = 50.52 MW

2. U.S. Flow

The flow available for U.S. power generation is the balance of the flow remaining after deducting the flow available for Canadian power from the total flow available for power.

QU = QT - QC (I,J)

QU = 72.39 - 36.2 = 36.19

From this total flow of 36.19, the U.S. Government Plant is allotted its present capacity of 12.7 TCFS and the Edison Sault Plant receives the balance of the flow available for U.S. power generation.

QS = QU - QGI

QS = 36.19 - 12.7 = 23.49

D. Edison Sault Head Losses

Next, the head loss in the Edison Sault Power Canal is computed with an equation from "Appendix F - Power".[1]

$$H(3) = 27800 \times QS^{2.6}/(ELSWP - 568.97)^{5.2}$$

$$H(3) = 27800 \times 23.49^{2.6}/(600.24 - 568.97)^{5.2}$$

$$H(3) = \underline{1.71} = HPLANT$$

NOTE: If H(3) is greater than 3.5 FPS, it is set equal to 3.5 and QS is recomputed.

The total head available at each power plant is the sum of all the losses deducted from the difference in head between Lake Superior and Lakes Michigan-Huron.

E. Head at U.S. Power Plants

Head at Edison Sault,

$$H(5) = H(1) - H(2) - H(3) - H(4) - .2$$

$$H(5) = 21.59 - .22 - 1.71 - 1.18 - .2 = 18.27 = HEDS$$

The elevation of the headrace at the Edison Sault Plant is the head loss deducted from the elevation at the SWP gauge.

$$ELPLANT = ELSWP - H(3)$$

[1] Ibid.

ELPLANT = 600.24 - 1.71 = 598.53

Head at U.S. Government Plant,

$$H(6) = H(1) - H(2) - .6 - H(4)$$

$$H(6) = 21.59 - .22 - .6 - 1.18$$

$$H(6) = 19.59 = HGOVT$$

F. Computation of Power Output

The equations used to compute the power output at each plant depends on the flow through the plant and the head,

1. Edison Sault

$$PSE_1 = .746[82H(5) - 220 + (89.5H(5) - 39)QS].94$$

IF $QS \leq 18.16 + .59\ H(5)$

$$PSE_2 = PSE_1 - (147)(.746)[QS - 18.16 - .59H(5)]^{1.6}(.94)$$

IF $H(5) \leq 17$ or $QS \leq 20.16 + .59H$

and $QS > 18.16 + .59H$

$$PSE_3 = PSE_2 - (100)(.746)[QS - 18.16 - .59H(5)]^{1.6}(.94)$$

IF $QS > 20.16 + .59H(5)$ and $H(5) > 17$

For this example.

$QS = 23.49$,

$18.16 + .59(18.27) = 28.9$

Thus the power output at Edison Sault is,

$$PSE = .746[82H(5) - 220 + (89.5 \times H(5) - 39)QS].94$$

$$PSE = .701[82 \times 18.27 - 220 + (89.5 \times 18.27 - 39)23.49]$$

$$PSE = 27179 \text{ KW}$$

2. U.S. Government Plant

$$PGV = 1055H(6) - 2890$$

IF $H(6) \leq 21.5$

$$PGV = 37,560 + H(6)\ [4280 - 75H(6)]$$

IF $H(6) > 21.5$

For this example, H(6) = 19.59

Thus the power output at the U.S. Government Plant is,

$$PGV = 1055H(6) - 2890$$

$$PGV = 1055(19.59) - 2890 = 17777 \text{ KW}$$

The program now adds PSE and PGV to obtain a total power output,

BOTH = PSE (I) + PGV (I)

PTOT = BOTH

BOTH = 27179 + 17777

BOTH = 44956

Determine the long-term monthly maximum and minimum power output during the period of record,

```
IF[BOTH .GT. PMAX(I)] PMAX(I) = BOTH        (Results in 12 values for
                                             the period of record)
IF[BOTH .LT. PMIN(I)] PMIN(I) = BOTH        (Results in 12 values for
                                             the period of record)
```

The monthly power output for each plant is multiplied by Amon (which is a factor in hrs./month) to convert from kw to kw-hrs; a cumulative total of power output in kw-hrs is then computed,

```
TPSE = TPSE + PSE(I) x AMON(I)     (One total for the period of record)
TPGV = TPGV + PGV(I) x AMON(I)     (One total for the period of record)
```

Compute the cumulative total of monthly power output in kilowatts for the period of record,

```
SUM(I) = SUM(I) + BOTH        (12 totals for the period of record)
```

Compute the total average monthly power output (in kw) for both power plants for the period of record,

```
AVG(I) = SUM(I)/FLOAT(I YRS)        (12 average outputs)
```

Compute the total power in kw-hrs,

TPOW = TPGV + TPSE (One total output)

Compute the cumulative total (in kw) of the long-term monthly minimum power outputs and then compute the average monthly minimum output,

SUMIN = SUMIN + PMIN(I)

AVEMIN = SUMAVG/12 (One average minimum output)

Compute the cumulative total (in kw) and the monthly average of the average monthly power outputs,

SUMAVG = SUMAVG + AVG(I)

AVGAVG = SUMAVG/12 (One average output)

Compute the energy costs, using an energy rate of 3.36,

ENGCOS = AVGAVG x 8.76 x ER

ENGCOS = AVGAVG x 8.76 x 3.36

G. Power Generation Costs

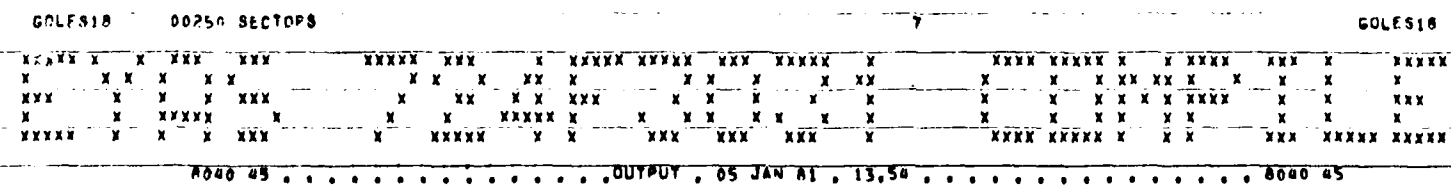
Compute the capacity cost using a demand rate of 28.33,

CAPCOS = AVEMIN x DR

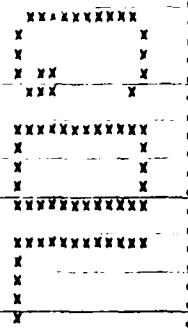
CAPCOS = AVEMIN x 28.33

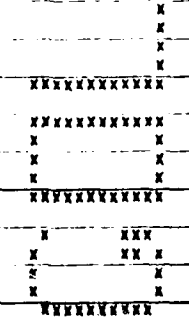
Compute the total cost of power generation,

Energy cost + capacity cost = total cost of power generation



8040 45 . . . . . OUTPUT . 05 JAN 81 . 13.58 . . . . . 8040 45





8040 45 . . . . . MONDAY . 05 JAN 81 . 14.37 . . . . . 8040 45

COMPILE PROGRAM FROM UPDATE
72#F3031
LARSEN

```
13.53.45. GOLES1A.  05 JAN 81   74002  BKY29P V0   GOL     NORM          R04085 EYAS 724F3
13.53.45. GOLES1A. GOL ,R04085,EYAS 724F3031 COMPILE PROGRAM FROM UPDATE
13.53.45. GOLES1A. *INPUT 6600R 13.51.4A, 05 JAN 81  VIA COKE
13.53.45. GOLES1A.  COPY,INPUT,1R,CONTROL/RR,DFM=OFF.
13.53.45. GOLES1A.  FLS=020K  FLL=0000K  LCM BUFFERS=0054K  TOTAL LCM=0074K
13.53.45. GOLES1A.   CONTROL DISK 2
13.53.45. GOLES1A.  COPY COMPLETE.
13.53.45. GOLES1A. (COMPILE PROGRAM FROM UPDATE/724F3031/LARSEN
13.53.46. GOLES1A. FETCHGS,OLDPL=LAKEREG/P482A/NEWPL,13864.
13.53.46. GOLES1A.  FLS=060K  FLL=0000K  LCM BUFFERS=0054K  TOTAL LCM=0134K
13.53.47. GOLES1A.   OLDPL   DISK 1
13.53.47. GOLES1A.  OLDPL          2103 WORDS COPIED FROM CACHE.
13.53.47. GOLES1A.   CACHE22 RETURNED      6 RLD, RS= 0040R,FS=1406418
13.53.47. GOLES1A.   ZZZZZFN DISK 2
13.53.47. GOLES1A.   ZZZZZFN UNLOADED      1 RLD, RS= 0040B,FS=0000018
13.53.47. GOLES1A.   TAPEPAC RETURNED      0 RLD, RS= 00028,FS=0000008
13.53.47. GOLES1A.   ZZZZZFN RETURNED      1 RLD, RS= 0040B,FS=0000018
13.53.47. GOLES1A. UPDATE,O,L=0.
13.53.47. GOLES1A.  UPDATE 1.2 -- VERSION 410-1H
13.53.47. GOLES1A.   COMPILE DISK 1
13.53.47. GOLES1A.  READING SEQUENTIAL OLDPL.
13.53.47. GOLES1A.  COPYING OLDPL TO RANDOM FILE
13.53.47. GOLES1A.   UPDTTPL DISK 2
13.53.4A. GOLES1A.   UPDTTPL RETURNED      0 RLD, RS= 0040B,FS=0000058
13.53.48. GOLES1A.  UPDATE COMPLETE.
13.53.4A. GOLES1A. FTN4,I=COMPILE,N=3.
13.53.4A. GOLES1A.  FLS=061K  FLL=0000K  LCM BUFFERS=0242K  TOTAL LCM=0323K
13.53.48. GOLES1A.   OUTPUT  DISK 1
13.53.48. GOLES1A. COMPILING P482A
13.53.48. GOLES1A.   ZZZZZFC DISK 2
13.53.48. GOLES1A.   ZZZZZRL DISK 1
13.53.49. GOLES1A.   ZZZZZRM DISK 1
13.53.50. GOLES1A.   LGO     DISK 1
13.53.51. GOLES1A. COMPILING TAIL
13.53.51. GOLES1A. COMPILING HEAD
13.53.51. GOLES1A. COMPILING PTITLE
13.53.51. GOLES1A. COMPILING STOMV
13.53.51. GOLES1A.   ZZZZZRL RETURNED      0 RLD, RS= 0040R,FS=0000018
13.53.51. GOLES1A.   ZZZZZRM RETURNED      0 RLD, RS= 00408,FS=000001B
13.53.51. GOLES1A.   ZZZZZFC RETURNED      0 RLD, RS= 00408,FS=000001B
13.53.51. GOLES1A.  COMPILATION COMPLETE. CP SEC     .59s
13.53.51. GOLES1A.   FTN4    RETURNED      1 RLD, RS= 0160B,FS=0001608
13.53.51. GOLES1A. FETCHGS,BSECSE=PLAN77/LL050/CD32/HEL07,24683.
13.53.51. GOLES1A.  FLS=060K  FLL=0000K  LCM BUFFERS=0202K  TOTAL LCM=0262K
13.53.52. GOLES1A.   BSECSE  DISK 1
13.53.54. GOLES1A.  BSECSE        60355 WORDS COPIED FROM CACHE.
13.53.54. GOLES1A.   CACHE22 RETURNED      9 RLD, RS= 00408,FS=1406418
13.53.54. GOLES1A.   ZZZZZFN DISK 2
13.53.54. GOLES1A.   ZZZZZFN UNLOADED      1 RLD, RS= 00408,FS=000001R
13.53.54. GOLES1A.   TAPEPAC RETURNED      0 RLD, RS= 00028,FS=0000008
13.53.54. GOLES1A.   ZZZZZFN RETURNED      1 RLD, RS= 00408,FS=000001R
13.53.54. GOLES1A. COPY,INPUT,1RXA,BSECSE,1RXA,INPUT,1RXB,BSECSE/BR,1RS,1RXB,1RS,1RXB,BSECSE/BU,3RS
13.53.54. GOLES1A. *,1RXA,INPUT,1RXB,INP/RR,DFM=OFF.
13.53.54. GOLES1A.  FLS=020K  FLL=0000K  LCM BUFFERS=0202K  TOTAL LCM=0222K
13.53.54. GOLES1A.   INP     DISK 1
13.53.54. GOLES1A.          1 RECORD(S) SKIPPED--BSECSE
13.53.54. GOLES1A.          1 RECORD(S) SKIPPED--BSECSE
13.53.54. GOLES1A.          3 RECORD(S) SKIPPED--BSECSE
13.53.54. GOLES1A.   BSECSE  UNLOADED      8 RLD, RS= 0040B,FS=0001678
13.53.54. GOLES1A.  COPY COMPLETE.
13.53.54. GOLES1A. LGO,INP,OUT.
13.53.55. GOLES1A.   ZZZZZLB DISK 2
```

```
13,53,55. GOLES1A.   ZZZZZLS DISK 2
13,53,55. GOLES1A.   ZZZZZLS RETURNED       0 BLD, BS= 00000B,FS=0000000B
13,53,55. GOLES1A.  FLS=112K  FLL=00000K  LCM BUFFERS=0214K  TOTAL LCM=0326K
13,53,55. GOLES1A.  FLS=122K  FLL=00000K  LCM BUFFERS=0214K  TOTAL LCM=0336K
13,54,00. GOLES1A.  FLS=132K  FLL=00000K  LCM BUFFERS=0314K  TOTAL LCM=0446K
13,54,00. GOLES1A.   DAGMAP  DISK 1
13,54,00. GOLES1A.   DAGMAP  UNLOADED       1 BLD, BS= 00008,FS=0000018
13,54,00. GOLES1A.   LGO     UNLOADED       1 BLD, BS= 00008,FS=0000068
13,54,00. GOLES1A.   FTN4LIB UNLOADED       1 BLD, BS= 01008,FS=0001008
13,54,00. GOLES1A.  LOAD COMPLETE, LINK 8,4,
13,54,00. GOLES1A.    TIME---          63 MSEC.
13,54,00. GOLES1A.    MEMORY.      LOAD    124100,  EXECUTE    112000.
13,54,00. GOLES1A.  FLS=112K  FLL=00000K  LCM BUFFERS=0154K  TOTAL LCM=0266K
13,54,00. GOLES1A.        BEGIN PROGRAM P4824      USING -
13,54,00. GOLES1B.           FTN4 LIBRARY 7600-VSN2/A0242,21,31
13,54,00. GOLES1A.   OUT      DISK 2
13,54,02. GOLES1A.     STOP
13,54,02. GOLES1B.      1,229 CP SECONDS EXECUTION TIME
13,54,02. GOLES1A.      4,858 COMPUTING UNITS USED
13,54,02. GOLES1A.   LINK     RETURNED       1 BLD, BS= 00128,FS=0000128
13,54,02. GOLES1B.   FTN4LIB RETURNED       1 BLD, BS= 01008,FS=0001008
13,54,02. GOLES1B. DISPOSE,OUT=PR,DT=I,T=(800 POWER/PLAN 77/BASE CASE),
13,54,02. GOLES1B.  FLS=060K  FLL=00000K  LCM BUFFERS=0242K  TOTAL LCM=0322K
13,54,03. GOLES1A.   OUT      UNLOADED       3 BLD, BS= 00408,FS=0000578
13,54,03. GOLES1A.   TAPEPAC DISK 1
13,54,03. GOLES1A.   TAPEPAC UNLOADED       1 BLD, BS= 00028,FS=0000018
13,54,17. GOLES1B.   TAPEPAC RETURNED       1 BLD, BS= 00028,FS=0000018
13,54,17. GOLES1A.  * OUT      QUEUED PR 372
13,54,17. GOLES1A.   STATION RETURNED       1 BLD, BS= 00028,FS=0000018
13,54,17. GOLES1B.   OUT      DELETED        3 BLD, BS= 00408,FS=0000578
13,54,17. GOLES1A. EXIT.
13,54,17. GOLES1B.   SKIP PAST FIN.     CARD
13,54,17. GOLES1B.    OUTPUT  QUEUED PR      2 BLD, BS= 00208,FS=0000268
13,54,17. GOLES1B.  *J 4E13510   R0404SN 05JAN81RZ N 000023          EVAS 724FS
13,54,17. GOLES1A.  ..............................
13,54,17. GOLES1A.  SECTORS TRANSFERRED        561
13,54,17. GOLES1A.  MAX DISK SECTORS           650
13,54,17. GOLES1A.  CP SECONDS               2,051
13,54,17. GOLES1A.  SYSTEM SECONDS           0,367
13,54,17. GOLES1A.  OLD BLDS                    17
13,54,17. GOLES1A.  LCM BUFFER LOADS            23
13,54,17. GOLES1B.  ITO CUS                      3
13,54,17. GOLES1B.  KWORDS XFERRED             290
13,54,17. GOLES1B.  CIO CALLS                  739
13,54,17. GOLES1B.  STAGING CUS                  0
13,54,17. GOLES1A.  ..............................
13,54,17. GOLES1B.  TOTAL JOB CUS               23
13,54,17. GOLES1B.  COST + OVERHEAD   $       1.56
13,54,17. GOLES1B.  ..............................

13,54,34. GOLES1A.  OUTPUT  QUEUED PR 173
```

```
      PROGRAM P4824(INPUT,OUTPUT)                                       FIX.1
C     WEINRUB POWER PROGRAM - 4824 - 724F3035                           P4824.4
C     20 JAN 1976                                                       P4824.5
C                                                                       P4824.6
C     INTERNATIONAL GREAT LAKES WATER LEVEL STUDY                       P4824.7
C                                                                       P4824.8
C     POWER AT U.S. PLANTS AT SAULT SAINT MARIE                         P4824.9
C                                                                       P4824.10
C     INPUT CARDS IN THE FOLLOWING ORDER                                P4824.11
C                                                                       P4824.12
C                                                                       P4824.13
C     READ 200 - PARAMETER CARD - 1 CARD                                P4824.14
C      COL        FMT        VAR DESCRIPTION                            P4824.15
C     01-05        I5       IYRS NUMBER OF YEARS OF DATA                P4824.16
C     06-10      F5.0        CON CONSTANT IN FEET TO CHANGE CONDITIONS ON P4824.17
C                                MICHIGAN-HURON (1933 OR 1968).         P4824.18
C     11-15        I5       IFSQ 0 IF THE PROGRAM COMPUTES THE MINIMUM  P4824.19
C                                FLOW THRU THE STRUCTURES.              P4824.20
C                                1 IF THE MINIMUM FLOW IS TO BE READ IN, P4824.21
C     16-20      F5.0       DLLO LONG LAKE OGOKI DIVERSION IN TCFS      P4824.22
C     21-25      F5.0       CMAX MAXIMUM DIVERSION OF FLOW FOR CANADIAN P4824.23
C                                POWER                                  P4824.24
C                               (CURRENTLY 35.0 INSTEAD OF 26.5)        P4824.25
C     26-30      F5.0       QMAX MAXIMUM SUPERIOR FLOW                  P4824.26
C     31-35      F5.0        QGI DIVERSION OF FLOW FOR US GOVERNMENT POWERP4824.27
C                                PLANT                                  P4824.28
C     36-40        I5      IFEPO 1 FOR PRINT OUT OF ALL VALUES COMPUTED FIX.2
C                                0 OTHERWISE                            FIX.3
C     41-45        I5      IFCSC 1 FOR CALCULATING CANADIAN DIVERSION  FIX.4
C                                0 OTHERWISE                            FIX.5
C                                                                       FIX.6
C     READ 118  - PARAMETER CARD - 1 CARD                               FIX.7
C      COL        FMT        VAR DESCRIPTION                            FIX.8
C     01-72    12F6.2         QM MONTHLY FLOW LOSS FOR NAVIGATION       FIX.9
C                                                                       P4824.29
C     READ 100 - DATA CARDS - IN THE ORDER SUPERIOR MONTHLY MEAN LEVELS P4824.30
C                                MICHIGAN-HURON MONTHLY MEAN LEVELS,    P4824.31
C                                SUPERIOR MONTHLY MEAN OUTFLOWS,        P4824.32
C                                AND, IF NECESSARY, THE FORCED MINIMUM  P4824.33
C                                FLOWS.                                 P4824.34
C      COL        FMT        VAR DESCRIPTION                            P4824.35
C     01-72    12F6.0        ELS SUPERIOR MONTHLY MEAN LEVELS           P4824.36
C     01-72    12F6.0        ELH MICHIGAN-HURON MONTHLY MEAN LEVELS     P4824.37
C     01-72    12F6.0         QO SUPERIOR MONTHLY MEAN OUTFLOWS         P4824.38
C     01-72    12F6.0        QQS FORCED MINIMUM FLOWS                   P4824.39
C                                                                       P4824.40
      DIMENSION ELS(12,100),ELH(12,100),QO(12,100),QM(12)    ,M(10),   P4824.41
     1AMON(12),IYEAR(100),PSE(12),PGV(12,100),PMAX(12),PMIN(12),AVG(12),P4824.42
     2QG(12,100),PTOT(12,100),QQS(12,100),SUM(12),NAM(27),ITITLE(270),  P4824.43
     3QS(12,100),HLAKES(12,100),HSWP(12,100),HPLANT(12,100),            P4824.44
     4HEDS(12,100),HURON(12,100),HGOVT(12,100),ELSWP(12,100),           P4824.45
     5ELPLANT(12,100),ELUSS(12,100),ELTRG(12,100),ELTRES(12,100)        P4824.46
      DIMENSION IY(2), EL011(12,100),EL012(12,100),QC(12,100),FM(12,100)FIX.10
      DIMENSION FT(12,100),CHEAD(12,100),PGLP(12,100)                   FIX.11
      COMMON A,B,AN,C,Q,CN,DN                                           FIX.12
```

```
      DATA AMON/744.,678.0,744.,720.,744.,720.,2*744.,720.,744.,720.,744P4824.49
     1./                                                                P4824.50
      DATA NAM   /3H - ,3HWEI,3HNRU,3HB P,3HOWE,3HR P,3HROG,3HRAM,3H - ,P4824.51
     13H4B2,3H4 -,3H 72,3H4F3,3H035,3H   ,3H   ,3H   ,3H   ,3H   ,3H   ,P4824.52
     23H   ,3H   ,3H   ,3H   ,3H   ,3H   ,3H   /                        P4824.53
      DATA IY/5H YEAR,1H /                                              FIX.13
C                                                                       P4824.54
C     ENERGY RATE                                                       P4824.55
C                                                                       P4824.56
      ER=3.36                                                           P4824.57
C                                                                       P4824.58
C     DEMAND RATE                                                       P4824.59
C                                                                       P4824.60
      DR=28.33                                                          P4824.61
      C=1.                                                              P4824.62
C                                                                       P4824.63
C     INITILIZE                                                         P4824.64
C     ---------                                                         P4824.65
C     MAXIMUM NUMBER OF TITLE CARDS                                     P4824.66
      MAXNCD = 10                                                       P4824.67
C                                                                       P4824.68
C                                                                       P4824.69
C                                                                       P4824.70
C     CALL DATE TIME SUBROUTINE                                         P4824.71
C     -------------------------                                         P4824.72
    1 CALL PTITLE ( 1, NAM, MAXNCD, ITITLE, NHC, III )                  P4824.73
C                                                                       P4824.74
C     READING IN FROM 1 TO MAXNCD HEADER CARDS                          P4824.75
C     A BLANK CARD INDICATES END OF CARD GROUP                          P4824.76
C     ----------------------------------------                          P4824.77
      CALL PTITLE ( 2, NAM, MAXNCD, ITITLE, NHC, III )                  P4824.78
      READ 200,IYRS,CON,IFSQ,DLLO,CMAX,QMAX,QGI,IFEPO,IFCSC             FIX.14
      IF(IYRS)4,4,8                                                     P4824.80
    4 STOP                                                              P4824.81
C     PRINT INPUT DATA                                                  P4824.82
C     ----------------                                                  P4824.83
    8 CALL PTITLE ( 3, NAM, MAXNCD, ITITLE, NHC, III )                  P4824.84
      PRINT 202,IYRS,CON,IFSQ,DLLO,CMAX,QMAX,QGI,IFEPO,IFCSC            FIX.15
      READ 118,QM                                                       FIX.16
      PRINT 118,QM                                                      FIX.17
      TPSF=0.                                                           P4824.86
      TPGV=0.                                                           P4824.87
      PRINT 102                                                         P4824.88
      PRINT 101,IY(1)                                                   FIX.18
      READ 100,((ELS(I,J),I=1,12),IYEAR(J),J=1,IYRS)                    FIX.19
      PRINT 103, (IYEAR(J),(ELS(I,J),I=1,12),J=1,IYRS)                  FIX.20
      READ 100                                                          P4824.94
      CALL PTITLE(3,NAM,MAXNCD,ITITLE,NHC,III)                          FIX.21
      PRINT 201                                                         P4824.95
      PRINT 101,IY(1)                                                   FIX.22
      READ 100,((ELH(I,J),I=1,12),IYEAR(J) ,J=1,IYRS)                   FIX.23
      DO 2 I=1,12                                                       FIX.24
      PMAX(I)=0.                                                        FIX.25
      PMIN(I)=99999.                                                    FIX.26
      SUM(I)=0.                                                         FIX.27
```

```
                      DO 7 J=1,IYRS                                          FIX,28
                      ELM(I,J)=ELM(I,J)*CON                                  FIX,29
                    7 CONTINUE                                               FIX,30
                    2 CONTINUE                                               FIX,31
  115                 PRINT 103, (IYEAR(J),(ELM(I,J),I=1,12),J=1,IYRS)       FIX,32
                      READ100                                                P4824,107
                      CALL PTITLE(3,NAM,MAXNCD,ITITLE,NMC,III)               FIX,33
                      PRINT 301                                              P4824,109
                      PRINT 101,IY(1)                                        FIX,34
  120                 READ 100,((QQ(I,J),I=1,12),IYEAR(J) ,J=1,IYRS)         FIX,35
                      PRINT 302,(IYEAR(J),(QQ(I,J),I=1,12),J=1,IYRS)         FIX,36
                      READ 100                                               P4824,114
                      IF(IFSQ)17,17,16                                       P4824,115
                   16 CALL PTITLE( 3,NAM,MAXNCD,ITITLE,NMC,III)              FIX,37
  125                 PRINT 300                                              FIX,38
                      PRINT 101,IY(1)                                        FIX,39
                      READ 100,((QQS(I,J),I=1,12),IYEAR(J),J=1,IYRS)         FIX,40
                      PRINT 302,(IYEAR(J),(QQS(I,J),I=1,12),J=1,IYRS)        FIX,41
                      READ 100                                               P4824,122
  130              17 CALL PTITLE ( 3, NAM, MAXNCD, ITITLE, NMC, III )       P4824,123
                      PRINT 400                                              FIX,42
                      PRINT 101,IY(1)                                        FIX,43
                      DO 10 J=1,IYRS                                         P4824,124
                   22 DO 5 I=1,12                                            P4824,125
  135                 IF(I-1)29,28,29                                        P4824,126
                   28 A=1.93                                                 P4824,127
                      B=569.56                                               P4824,128
                      AN=.2                                                  P4824,129
                      BM=135.11                                              FIX,44
  140                 CN=1142.14                                             FIX,45
                      ON=.2926                                               FIX,46
                      GO TO 11                                               P4824,130
                   29 IF(I-4) 11,9,11                                        P4824,131
                    9 A=1.605                                                P4824,132
  145                 B=567.29                                               P4824,133
                      AN=.4                                                  P4824,134
                      BM=187.07                                              FIX,47
                      CN=1138.2                                              FIX,48
                      ON=.2978                                               FIX,49
  150                 Q=QQ(I,J)                                              P4824,135
                      FLOW(I,J)=ELR(I,J)*(Q/BM)**2                           FIX,50
                      M(1)=ELS(I,J)-ELM(I,J)                                 P4824,136
                      MLAKES(I,J)=M(1)                                       P4824,137
                      M(2)=37.43E-7*Q**.06572                                P4824,138
  155                 MSWP(I,J)=M(2)                                         P4824,139
                      ELSWP(I,J)=ELS(I,J)-M(2)                               P4824,140
                      CALL MEAN(ELM(I,J),M(4))                               P4824,141
                      MURON(I,J)=M(4)                                        P4824,142
                      ELUSS(I,J)=ELM(I,J)+M(4)                               P4824,143
  160                 ELTRG(I,J)=ELUSS(I,J)+.4                               P4824,144
                      ELTRES(I,J)=ELUSS(I,J)+.2                              P4824,145
                      IF(Q.GT.QMAX)Q=QMAX                                    P4824,146
                      IF(IFSQ)32,31,32                                       P4824,147
                   32 QS(I,J)=QQS(I,J)                                       P4824,148
  165                 GO TO 30                                               P4824,149
```

```
   31 QT=Q-QM(I)-2.                                                    FIX.51
      QC(I,J)=(QT+DLLQ)/2.                                             FIX.52
      IF(QC(I,J).GT.CMAX) QC(I,J)=CMAX                                 FIX.53
   70 FH(I,J)= EL011(I,J)-.0211*(1000.*QC(I,J))**2.2826*(EL011(I,J)-574.FIX.54
     1147)**(-6.06)                                                    FIX.55
      CALL TAIL(ELH(I,J),QC(I,J),EL012(I,J))                           FIX.56
      FT(I,J)=EL012(I,J)+1.2394E-5 *QC(I,J)*QC(I,J)*(590.551-EL012(I,J))FIX.57
     1**1.39                                                           FIX.58
      CHEAD(I,J)=FH(I,J)-FT(I,J)                                       FIX.59
      IF(IFCSC)74,74,75                                                FIX.60
   75 CQMAX=CHEAD(I,J)+17.6                                            FIX.61
      CQMIN=CHEAD(I,J)*.85+13.9                                        FIX.62
      IF(CQMAX+1-QC(I,J))72,71,71                                      FIX.63
   71 IF(QC(I,J)+1-CQMIN)73,74,74                                      FIX.64
   72 QC(I,J)=(QC(I,J)+CQMAX)*.5                                       FIX.65
      GOTO 70                                                          FIX.66
   73 QC(I,J)=(QC(I,J)+CQMIN)*.5                                       FIX.67
      GO TO 70                                                         FIX.68
   74 PGLP(I,J)= 72.691*QC(I,J)*CHEAD(I,J)                             FIX.69
      QU=QT-QC(I,J)                                                    FIX.70
      QS(I,J)=QU-QGI                                                   P4824.154
      IF(QS(I,J).LE.0)QS(I,J)=0                                        P4824.155
      QG(I,J)=QU-QS(I,J)                                               P4824.156
   30 H(3)=278E2*QS(I,J)**2.6/(ELSWP(I,J)-568.97)**5.2                 P4824.157
      IF(H(3)-3.5)15,15,13                                             P4824.158
   13 BN=1./2.6                                                        P4824.159
      H(3)=3.5                                                         P4824.160
      IF(IFSQ)15,33,15                                                 P4824.161
   33 QS(I,J)=(ELSWP(I,J)-568.97)**2/(278E2/3.5)**BN                   P4824.162
   15 H(5)=H(1)-H(2)-H(3)-H(4)-.2                                      P4824.163
      HPLANT(I,J)=H(3)                                                 P4824.164
      ELPLANT(I,J)=ELSWP(I,J)-H(3)                                     P4824.165
      HEDS(I,J)=H(5)                                                   P4824.166
      H(6)=H(1)-H(2)-.6-H(4)                                           P4824.167
      HGOVT(I,J)=H(6)                                                  P4824.168
      PSE(I)=.746*(82.*H(5)-220.+(89.5*H(5)-39.)*QS(I,J))*.94          P4824.169
      QSL=18.16+H(5)*.59                                               P4824.170
      IF(QS(I,J)-QSL)20,20,19                                          P4824.171
   19 PSE(I)=PSE(I)-147.*.746*(QS(I,J)-QSL)**1.6*.94                   P4824.172
      IF(H(5).LE.17..OR.QS(I,J).LE.(QSL+2.))GO TO 20                   P4824.173
      PSE(I)=PSE(I)-100.*.746*(QS(I,J)-QSL-2.)**1.6*.94                P4824.174
   20 PGV(I,J)=1055.*H(6)-2890.                                        P4824.175
      IF(H(6).GT.21.5)PGV(I,J)=-37560.+H(6)*(4280.-75.*H(6))           P4824.176
      BOTH=PSE(I)+PGV(I,J)                                             P4824.177
      PTOT(I,J)=BOTH                                                   P4824.178
      IF(BOTH.GT.PMAX(I))PMAX(I)=BOTH                                  P4824.179
      IF(BOTH.LT.PMIN(I))PMIN(I)=BOTH                                  P4824.180
      TPSE=TPSE+PSE(I)*AMON(I)                                         P4824.181
      TPGV=TPGV+PGV(I,J)*AMON(I)                                       P4824.182
      SUM(I)=SUM(I)+BOTH                                               P4824.183
    5 CONTINUE                                                         P4824.184
      PRINT 402,IYEAR(J),PSE                                           FIX.71
   10 CONTINUE                                                         FIX.72
      DO 34 I=1,12                                                     FIX.73
      AVG(I)=SUM(I)/FLOAT(IYRS)                                        FIX.74
```

```
      34 CONTINUE                                                       FIX.75
         TPOW=TPGV+TPSE                                                 FIX.76
         PRINT 406,TPSE                                                 FIX.77
         CALL PTITLE(3,NAM,MAXNCD,ITITLE,NHC,III)                       FIX.78
225      PRINT 500                                                      FIX.79
         PRINT 101,IY(1)                                                FIX.80
         PRINT 402,(IYEAR(J),(PGV(I,J),I=1,12),J=1,IYRS)                FIX.81
         PRINT 406,TPGV                                                 FIX.82
         CALL PTITLE(3,NAM,MAXNCD,ITITLE,NHC,III)                       FIX.83
230      PRINT 510                                                      FIX.84
         PRINT 101,IY(1)                                                FIX.85
         PRINT 402,(IYEAR(J),(PTOT(I,J),I=1,12),J=1,IYRS)               FIX.86
         PRINT 406,TPOW                                                 FIX.87
         CALL PTITLE(3,NAM,MAXNCD,ITITLE,NHC,III)                       FIX.88
235      PRINT 510                                                      FIX.89
         PRINT 403                                                      FIX.90
         PRINT 101,IY(2)                                                FIX.91
         PRINT 401,PMAX                                                 FIX.92
         PRINT 404                                                      FIX.93
240      PRINT 101,IY(2)                                                FIX.94
         PRINT 401,PMIN                                                 FIX.95
         PRINT 405                                                      FIX.96
         PRINT 101,IY(2)                                                FIX.97
         PRINT 401,AVG                                                  FIX.98
245      SUMMIN=0.                                                      FIX.99
         SUMAVG=0.                                                      FIX.100
         DO 12 I=1,12                                                   FIX.101
         SUMMIN=SUMMIN+PMIN(I)                                          FIX.102
         SUMAVG=SUMAVG+AVG(I)                                           FIX.103
250   12 CONTINUE                                                       FIX.104
         AVEAVG=SUMAVG/12.                                              FIX.105
         AVEMIN=SUMMIN/12.                                              FIX.106
         ENGCOS=AVEAVG*A.76*ER                                          FIX.107
         CAPCOS=AVEMIN*DR                                               FIX.108
255      TOTCOS=ENGCOS+CAPCOS                                           FIX.109
         PRINT 407,AVEAVG                                               FIX.110
         PRINT 408,AVEMIN                                               FIX.111
         PRINT 409,ENGCOS                                               FIX.112
         PRINT 410,CAPCOS                                               FIX.113
260      PRINT 411,TOTCOS                                               FIX.114
         IF(IFEP01),1,48                                                FIX.115
      48 CALL PTITLE(3,NAM,MAXNCD,ITITLE,NHC,III)                       FIX.116
         PRINT 104                                                      P4824.187
         PRINT 101,IY(1)                                                FIX.117
265      PRINT 103,(IYEAR(J),(QG(I,J),I=1,12),J=1,IYRS)                 FIX.118
         CALL PTITLE (3,NAM,MAXNCD,ITITLE,NHC,III)                      P4824.193
         PRINT 105                                                      P4824.194
         PRINT 101,IY(1)                                                FIX.119
         PRINT 103,(IYEAR(J),(QS(I,J),I=1,12),J=1,IYRS)                 FIX.120
270      CALL PTITLE(3,NAM,MAXNCD,ITITLE,NHC,III)                       FIX.121
         PRINT 121                                                      FIX.122
         PRINT 101,IY(1)                                                FIX.123
         PRINT 103,(IYEAR(J),(QC     (I,J),I=1,12),J=1,IYRS)            FIX.124
         CALL PTITLE (3,NAM,MAXNCD,ITITLE,NHC,III)                      P4824.200
275      PRINT 106                                                      P4824.201
```

```
                PRINT 101,IY(1)                                          FIX,125
                PRINT 105,(IYEAR(J),(HLAKES(I,J),I=1,12),J=1,IYRS)       FIX,126
                CALL PTITLE (3,NAM,MAXNCD,ITITLE,NMC,III)                P4824,206
                PRINT 107                                                P4824,207
280             PRINT 101,IY(1)                                          FIX,127
                PRINT 103,(IYEAR(J),(HSHP  (I,J),I=1,12),J=1,IYRS)       FIX,128
                CALL PTITLE (3,NAM,MAXNCD,ITITLE,NMC,III)                FIX,129
                PRINT 112                                                FIX,130
                PRINT 101,IY(1)                                          FIX,131
285             PRINT 103,(IYEAR(J),(ELSHP (I,J),I=1,12),J=1,IYRS)       FIX,132
                CALL PTITLE (3,NAM,MAXNCD,ITITLE,NMC,III)                FIX,133
                PRINT 109                                                FIX,134
                PRINT 101,IY(1)                                          FIX,135
                PRINT 103,(IYEAR(J),(HURON (I,J),I=1,12),J=1,IYRS)       FIX,136
290             CALL PTITLE (3,NAM,MAXNCD,ITITLE,NMC,III)                FIX,137
                PRINT 115                                                FIX,138
                PRINT 101,IY(1)                                          FIX,139
                PRINT 105,(IYEAR(J),(ELUSS (I,J),I=1,12),J=1,IYRS)       FIX,140
                CALL PTITLE (3,NAM,MAXNCD,ITITLE,NMC,III)                FIX,141
295             PRINT 108                                                FIX,142
                PRINT 101,IY(1)                                          FIX,143
                PRINT 103,(IYEAR(J),(MPLANT(I,J),I=1,12),J=1,IYRS)       FIX,144
                CALL PTITLE (3,NAM,MAXNCD,ITITLE,NMC,III)                FIX,145
                PRINT 113                                                FIX,146
300             PRINT 101,IY(1)                                          FIX,147
                PRINT 103,(IYEAR(J),(ELPLANT(I,J),I=1,12),J=1,IYRS)      FIX,148
                CALL PTITLE (3,NAM,MAXNCD,ITITLE,NMC,III)                FIX,149
                PRINT 117                                                FIX,150
                PRINT 101,IY(1)                                          FIX,151
305             PRINT 103,(IYEAR(J),(ELTRES(I,J),I=1,12),J=1,IYRS)       FIX,152
                CALL PTITLE (3,NAM,MAXNCD,ITITLE,NMC,III)                FIX,153
                PRINT 116                                                FIX,154
                PRINT 101,IY(1)                                          FIX,155
                PRINT 103,(IYEAR(J),(ELTRG (I,J),I=1,12),J=1,IYRS)       FIX,156
310             CALL PTITLE (3,NAM,MAXNCD,ITITLE,NMC,III)                FIX,157
                PRINT 110                                                FIX,158
                PRINT 101,IY(1)                                          FIX,159
                PRINT 103,(IYEAR(J),(HEDS  (I,J),I=1,12),J=1,IYRS)       FIX,160
                CALL PTITLE (3,NAM,MAXNCD,ITITLE,NMC,III)                FIX,161
315             PRINT 111                                                FIX,162
                PRINT 101,IY(1)                                          FIX,163
                PRINT 103,(IYEAR(J),(HGOVT (I,J),I=1,12),J=1,IYRS)       FIX,164
                CALL PTITLE(3,NAM,MAXNCD,ITITLE,NMC,III)                 FIX,165
                PRINT 119                                                FIX,166
320             PRINT 101,IY(1)                                          FIX,167
                PRINT 103,(IYEAR(J),(ELOT) (I,J),I=1,12),J=1,IYRS)       FIX,168
                CALL PTITLE(3,NAM,MAXNCD,ITITLE,NMC,III)                 FIX,169
                PRINT 122                                                FIX,170
                PRINT 101,IY(1)                                          FIX,171
325             PRINT 103,(IYEAR(J),(FH    (I,J),I=1,12),J=1,IYRS)       FIX,172
                CALL PTITLE(3,NAM,MAXNCD,ITITLE,NMC,III)                 FIX,173
                PRINT 120                                                FIX,174
                PRINT 101,IY(1)                                          FIX,175
                PRINT 103,(IYEAR(J),(ELO12 (I,J),I=1,12),J=1,IYRS)       FIX,176
330             CALL PTITLE(3,NAM,MAXNCD,ITITLE,NMC,III)                 FIX,177
```

```
                PRINT 123                                                       FIX,178
                PRINT 101,IY(1)                                                 FIX,179
                PRINT 103,(IYEAR(J),(FT    (I,J),I=1,12),J=1,IYRS)              FIX,180
                CALL PTITLE(3,NAM,MAXNCD,ITITLE,NMC,III)                        FIX,181
  335           PRINT 124                                                       FIX,182
                PRINT 101,IY(1)                                                 FIX,183
                PRINT 103,(IYEAR(J),(CHEAD (I,J),I=1,12),J=1,IYRS)              FIX,184
                CALL PTITLE(3,NAM,MAXNCD,ITITLE,NMC,III)                        FIX,185
                PRINT 125                                                       FIX,186
  340           PRINT 101,IY(1)                                                 FIX,187
                PRINT 402,(IYEAR(J),(PGLP  (I,J),I=1,12),J=1,IYRS)              FIX,188
                GO TO 1                                                         P4824,272
            100 FORMAT(12F6.0,4X,I4)                                            FIX,189
            101 FORMAT(4A,3HJAN5X3HFEB5X3HMAR5X3HAPR5X3HMAY5X3HJUN5X3HJUL5X3    FIX,190
  345         1HAUG5X3HSEP5X3HOCT5X3HNOV5X3HDEC/)                             P4824,277
            102 FORMAT(26H LAKE SUPERIOR MEAN STAGES/)                          P4824,278
            103 FORMAT(I5,12F8.2)                                               P4824,279
            104 FORMAT(43H US GOVERNMENT POWER PLANT FLOWS IN 1000CFS/)         P4824,280
            105 FORMAT(42H EDISON SAULT POWER PLANT FLOWS IN 1000CFS/)          P4824,281
  350       106 FORMAT(50H HEAD LOSS FROM LAKE SUPERIOR TO LAKE MICH-HURON IN FT/)P4824,282
            107 FORMAT(42H HEAD LOSS FROM LAKE SUPERIOR TO SWP IN FT/)          P4824,283
            108 FORMAT(47H HEAD LOSS FROM SWP TO EDISON SAULT PLANT IN FT/)     P4824,284
            109 FORMAT(40H HEAD LOSS FROM USS TO LAKE MICH-HURON IN FT/)        P4824,285
            110 FORMAT(43H HEAD AVAILABLE AT EDISON SAULT PLANT IN FT/)         P4824,286
  355       111 FORMAT(40H HEAD AVAILABLE AT US GOVERNMENT PLANT IN FT/)        P4824,287
            112 FORMAT(29H ELEVATION AT SWP GAUGE IN FT/)                       P4824,288
            113 FORMAT(50H ELEVATION OF HEADRACE AT EDISON SAULT PLANT IN FT/)  P4824,289
            114 FORMAT(16X,I2,1X,A3,I3,I5)                                      P4824,290
            115 FORMAT(29H ELEVATION AT USS GAUGE IN FT/)                       P4824,291
  360       116 FORMAT(51H ELEVATION OF TAILRACE AT US GOVERNMENT PLANT IN FT/) P4824,292
            117 FORMAT(50H ELEVATION OF TAILRACE AT EDISON SAULT PLANT IN FT/)  P4824,293
            118 FORMAT(12F6.2,I4)                                               P4824,294
            120 FORMAT(54H ELEVATION AT CMS GAUGE 012                  /)FIX,191
            119 FORMAT(54H ELEVATION AT CMS GAUGE 011                  /)FIX,192
  365       121 FORMAT(54H CANADIAN FLOW FOR POWER TCFS                /)FIX,193
            122 FORMAT(54H  ELEVATION AT FOREBAY FOR GREAT LAKES POWER FEET /)FIX,194
            123 FORMAT(54H  ELEVATION AT TAILRACE FOR GREAT LAKES POWER FEET /)FIX,195
            124 FORMAT(54H  AVAILABLE HEAD FOR GREAT LAKES POWER FEET   /)FIX,196
            125 FORMAT(54H  POWER OUTPUT GREAT LAKES POWER KILOWATTS    /)FIX,197
  370       200 FORMAT(I5,F5.0,I5,4F5.0,2I5)                                  FIX,198
            201 FORMAT(23HOLAKE HURON MEAN STAGES/)                           P4824,303
            202 FORMAT(I10,F10.5,I3,4F10.5,2I5)                               FIX,199
            300 FORMAT(42HOSAULT EDISON POWER PLANT FLOWS IN 1000CFS/)        P4824,305
            301 FORMAT(39HOLAKE SUPERIOR MEAN OUTFLOWS IN 1000CFS/)           P4824,306
  375       302 FORMAT(I5,F6.0,11F8.0)                                        P4824,307
            400 FORMAT(47HOSAULT EDISON PLANT - POWER OUTPUT IN KILOWATTS)    P4824,308
            401 FORMAT(5X,12F8.0)                                             FIX,200
            402 FORMAT(I5,12F8.0)                                             FIX,201
            403 FORMAT(//20X,15H MAXIMUM OUTPUT/)                             FIX,202
  380       404 FORMAT(/20X,15H MINIMUM OUTPUT/)                              FIX,203
            405 FORMAT(/20X,15H AVERAGE OUTPUT/)                              FIX,204
            406 FORMAT(17HOTHE TOTAL KWH IS,E20.8)                            FIX,205
            407 FORMAT(43HOMONTHLY AVERAGE OUTPUT        (ENERGY=KW),F15.2//) FIX,206
            408 FORMAT(43HOMONTHLY AVERAGE MIN. OUTPUT (CAPACITY=KW),F15.2//) FIX,207
  385       409 FORMAT (16H ENERGY COST  $,F15.2//)                           FIX,208
```

```
                410 FORMAT (16H CAPACITY COST $,F15.2//)                          FIX.209
                411 FORMAT (16H TOTAL COST    $,F15.2//)                          FIX.210
                500 FORMAT(45HOGOVERNMENT PLANT - POWER OUTPUT IN KILOWATTS)      FIX.211
                510 FORMAT(/20X,40H BOTH PLANTS - POWER OUTPUT IN KILOWATTS/)     FIX.212
    390             END                                                           P4824.321
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS DEF LINE REFERENCES

1121 P4824 1

VARIABLES	SN	TYPE	RELOCATION									
0	A	REAL	/ /	REFS	55	DEFINED	136	144				
13752	AMON	REAL	ARRAY	REFS	47	213	214	DEFINED	56			
2	AN	REAL	/ /	REFS	55	DEFINED	138	146				
4677	AVEAVG	REAL		REFS	253	256	DEFINED	251				
4700	AVEMIN	REAL		REFS	254	257	DEFINED	252				
16456	AVG	REAL	ARRAY	REFS	47	204	249	DEFINED	220			
1	B	REAL	/ /	REFS	55	DEFINED	137	145				
4644	BM	REAL		REFS	151	DEFINED	139	147				
4671	BN	REAL		REFS	194	DEFINED	191					
4673	BOTH	REAL		REFS	210	2*211	2*212	215	DEFINED	209		
3	C	REAL	/ /	REFS	55	DEFINED	70					
4702	CAPCOB	REAL		REFS	255	259	DEFINED	254				
76041	CHEAD	REAL	ARRAY	REFS	54	176	177	184	337			
				DEFINED	174							
4653	CMAX	REAL		REFS	93	2*168	DEFINED	87				
5	CN	REAL	/ /	REFS	55	DEFINED	140	148				
4650	CON	REAL		REFS	93	112	DEFINED	87				
4666	COMAX	REAL		REFS	178	180	DEFINED	176				
4667	COMIN	REAL		REFS	179	182	DEFINED	177				
4652	DLLO	REAL		REFS	93	167	DEFINED	87				
6	DN	REAL	/ /	REFS	55	DEFINED	141	149				
4643	DP	REAL		REFS	254	DEFINED	69					
7144	ELH	REAL	ARRAY	REFS	47	112	115	152	157	159	171	
				DEFINED	106	112						
50777	ELPLANT	REAL	ARRAY	REFS	47	301	DEFINED	197				
4704	ELS	REAL	ARRAY	REFS	47	101	151	152	156			
				DEFINED	100							
46517	ELSHP	REAL	ARRAY	REFS	47	189	198	197	285			
				DEFINED	156							
60017	ELTRES	REAL	ARRAY	REFS	47	305	DEFINED	161				
55537	ELTRG	REAL	ARRAY	REFS	47	309	DEFINED	160				
53257	ELUSS	REAL	ARRAY	REFS	47	160	161	293	DEFINED	158		
62321	ELWII	REAL	ARRAY	REFS	53	2*169	321	DEFINED	151			
64541	ELWIZ	REAL	ARRAY	REFS	53	171	2*172	329				
4701	ENGCOB	REAL		REFS	255	258	DEFINED	253				
4642	EP	REAL		REFS	253	DEFINED	65					
71321	FM	REAL	ARRAY	REFS	53	174	325	DEFINED	169			
73641	FT	REAL	ARRAY	REFS	56	174	333	DEFINED	172			
13740	H	REAL	ARRAY	REFS	47	153	155	156	157	158	159	

VARIABLES	SN	TYPE	RELOCATION								
				190	4*195	196	197	198	3*199	200	2*201
				202	205	207	3*208	DEFINED	152	154	189
				192	195	199					
37477	MEDS	REAL	ARRAY	REFS	47	313	DEFINED	198			
44237	MGOVT	REAL	ARRAY	REFS	47	317	DEFINED	200			
30457	MLARES	REAL	ARRAY	REFS	47	277	DEFINED	153			
35217	MPLANT	REAL	ARRAY	REFS	47	297	DEFINED	196			
32737	MS&P	REAL	ARRAY	REFS	47	281	DEFINED	155			
81757	MURON	REAL	ARRAY	REFS	47	289	DEFINED	158			
4663	I	INTEGER		REFS	100	101	106	108	109	110	2*112
				115	120	121	127	128	135	143	150
				2*151	2*152	153	155	2*156	157	158	2*159
				2*160	2*161	2*164	166	167	2*168	4*169	3*171
				5*172	3*174	176	177	178	179	2*180	2*182
				3*184	185	186	2*187	2*188	2*189	2*194	196
				2*197	198	200	2*201	203	3*204	205	3*206
				207	208	2*209	210	2*211	2*212	2*213	2*214
				2*215	2*220	227	232	248	249	265	269
				273	277	281	285	289	293	297	301
				305	309	313	317	321	325	329	333
				337	341	DEFINED	100	101	106	107	115
				120	121	127	128	134	219	227	232
				247	265	269	273	277	281	285	289
				293	297	301	305	309	313	317	321
				325	329	333	337	341			
4657	IFCSC	INTEGER		REFS	93	175	DEFINED	87			
4656	IFEPD	INTEGER		REFS	93	261	DEFINED	87			
4651	IFSQ	INTEGER		REFS	93	123	163	193	DEFINED	87	
4646	III	INTEGER		REFS	81	86	92	103	117	124	130
				224	229	234	262	266	270	274	278
				282	286	290	294	298	302	306	310
				314	318	322	326	330	334	338	
25561	ITITLE	INTEGER	ARRAY	REFS	47	81	86	92	103	117	124
				130	224	229	234	262	266	270	274
				278	282	286	290	294	298	302	306
				310	314	318	322	326	330	334	338
62277	IV	INTEGER	ARRAY	REFS	53	99	105	119	126	132	226
				231	237	240	243	264	268	272	276
				280	284	288	292	296	300	304	308
				312	316	320	324	328	332	336	340
				DEFINED	61						
13766	IYEAR	INTEGER	ARRAY	REFS	47	101	115	121	124	217	227
				232	265	269	273	277	281	285	289
				293	297	301	305	309	313	317	321
				325	329	333	337	341	DEFINED	100	106
				120	127						
4647	IYRS	INTEGER		REFS	88	93	100	101	106	111	115
				120	121	127	128	133	220	227	232
				265	269	273	277	281	285	289	293
				297	301	305	309	313	317	321	325
				329	333	337	341	DEFINED	87		
4662	J	INTEGER		REFS	2*100	2*101	2*104	2*112	2*115	2*120	2*121
				2*127	2*128	150	2*151	2*152	153	155	2*156
				157	158	2*159	2*160	2*161	2*164	167	2*168
				4*169	3*171	5*172	3*174	176	177	178	179

VARIABLES	SN	TYPE		RELOCATION							
					2+180	2+182	3+184	185	186	2+187	2+188	2+189
					2+190	196	2+197	198	200	201	203	204
					205	206	207	208	209	210	214	217
					2+227	2+232	2+265	2+269	2+273	2+277	2+281	2+285
					2+289	2+293	2+297	2+301	2+305	2+309	2+313	2+317
					2+321	2+325	2+329	2+333	2+337	2+341		
					DEFINED	100	101	106	111	115	120	121
					127	128	133	227	232	265	269	273
					277	281	285	289	293	297	301	305
					309	313	317	321	325	329	333	337
					341							
4644	MAXNCD	INTEGER			REFS	81	86	92	103	117	124	130
					224	229	234	262	266	270	274	278
					282	286	290	294	298	302	306	310
					314	318	322	326	330	334	338	
					DEFINED	75						
25526	NAM	INTEGER	ARRAY		REFS	87	81	86	92	103	117	124
					130	224	229	234	262	266	270	274
					278	282	286	290	294	298	302	306
					310	314	318	322	326	330	334	338
					DEFINED	58						
4645	NMC	INTEGER			REFS	81	86	92	103	117	124	130
					224	229	234	262	266	270	274	278
					282	286	290	294	298	302	306	310
					314	318	322	326	330	334	338	
100341	PGLP	REAL	ARRAY		REFS	54	341	DEFINED	184			
14146	PGV	REAL	ARRAY		REFS	87	209	218	227	DEFINED	207	208
16426	PMAX	REAL	ARRAY		REFS	87	211	238	DEFINED	108	211	
16402	PMIN	REAL	ARRAY		REFS	87	212	241	248	DEFINED	109	212
12132	PSE	REAL	ARRAY		REFS	87	204	206	209	213	217	
					DEFINED	201	204	206				
20792	PTOT	REAL	ARRAY		REFS	87	232	DEFINED	210			
8	Q	REAL			REFS	55	151	154	162	166		
					DEFINED	150	162					
67041	QC	REAL	ARRAY		REFS	53	168	169	171	2+172	178	179
					180	182	184	185	273	DEFINED	167	168
					180	182						
16472	QG	REAL	ARRAY		REFS	87	265	DEFINED	188			
4655	QGI	REAL			REFS	93	186	DEFINED	87			
13728	QM	REAL	ARRAY		REFS	87	95	166	DEFINED	94		
4654	QMAX	REAL			REFS	93	2+162	DEFINED	87			
11868	QQ	REAL	ARRAY		REFS	87	121	150	DEFINED	120		
23232	QQS	REAL	ARRAY		REFS	87	128	164	DEFINED	127		
26177	QS	REAL	ARRAY		REFS	87	187	188	189	201	203	204
					205	206	269	DEFINED	164	186	187	194
4672	QSL	REAL			REFS	203	204	205	206	DEFINED	202	
4665	QT	REAL			REFS	167	185	DEFINED	166			
4670	QU	REAL			REFS	186	188	DEFINED	185			
25512	SUM	REAL	ARRAY		REFS	87	215	220	DEFINED	110	215	
4676	SUMAVG	REAL			REFS	249	251	DEFINED	246	249		
4675	SUMMIN	REAL			REFS	248	252	DEFINED	245	248		
4703	TOTCOB	REAL			REFS	260	DEFINED	255				
4661	TPGV	REAL			REFS	214	222	228	DEFINED	97	214	
4674	TPOH	REAL			REFS	233	DEFINED	222				
4660	TPSE	REAL			REFS	213	222	223	DEFINED	96	213	

FILE NAMES MODE

0 INPUT FMT

445 OUTPUT FMT

READS 87 94 100 102 106 116 120 122 127 129

WRITES 93 95 98 99 101 104 105 115 118 119 121 125 126 128 131 132 217 223 225 226 227 228 230 231 232 233 235 236 237 238 239 240 241 242 243 244 256 257 258 259 260 263 264 265 267 268 269 271 272 273 275 276 277 279 280 281 283 284 285 287 288 289 291 292 293 295 296 297 299 300 301 303 304 305 307 308 309 311 312 313 315 316 317 319 320 321 323 324 325 327 328 329 331 332 333 335 336 337 339 340 341

EXTERNALS TYPE ARGS REFERENCES

HEAD 2 157

PTITLE 6 81 86 92 103 117 126 130 224 229 234 262 266 270 274 278 282 286 290 294 298 302 306 310 314 318 322 326 330 334 338

TAIL 3 171

INLINE FUNCTIONS TYPE ARGS DEF LINE REFERENCES

FLOAT REAL 1 INTRIN 220

STATEMENT LABELS DEF LINE REFERENCES

1127 1 81 2*261 342

0 2 114 107

0 4 INACTIVE 89 2*88

0 5 216 134

0 7 113 111

1140 8 92 88

0 9 INACTIVE 148 143

0 10 218 133

1505 11 150 142 2*143

0 12 250 247

0 13 INACTIVE 191 190

1716 15 195 2*190 2*193

0 16 INACTIVE 124 123

1451 17 130 2*123

0 19 INACTIVE 204 201

1770 20 207 2*203 205

0 22 INACTIVE 134

0 28 INACTIVE 136 135

1473 29 143 2*135

1647 30 189 165

1505 31 166 163

0 32 INACTIVE 168 2*163

0 33 INACTIVE 194 193

0 34 221 219

0 48 INACTIVE 262 261

1560 70 169 181 183

0 71 INACTIVE 179 2*178

STATEMENT LABELS DEF LINE REFERENCES

1634	72			180	17A									
1642	73			182	179									
1650	74			184	2*175	2*179								
0	75		INACTIVE	176	175									
4183	100	FMT		343	100	102	106	116	120	122	127	129		
4186	101	FMT		344	99	105	119	120	132	226	231	237	240	
					243	264	268	272	276	280	284	288	292	
					296	300	304	308	312	316	320	324	328	
					332	336	340							
4160	102	FMT		346	98									
4165	103	FMT		347	101	115	265	269	273	277	281	285	289	
					293	297	301	305	309	313	317	321	325	
					329	333	337							
4170	104	FMT		348	263									
4176	105	FMT		349	267									
4204	106	FMT		350	275									
4213	107	FMT		351	279									
4221	108	FMT		352	295									
4230	109	FMT		353	287									
4236	110	FMT		354	311									
4244	111	FMT		355	315									
4252	112	FMT		356	283									
4257	113	FMT		357	299									
4266	114	FMT	NO REFS	358										
4271	115	FMT		359	291									
4276	116	FMT		360	307									
4305	117	FMT		361	303									
4310	118	FMT		362	94	95								
4326	119	FMT		364	319									
4317	120	FMT		363	327									
4335	121	FMT		365	271									
4348	122	FMT		366	323									
4353	123	FMT		367	331									
4362	124	FMT		368	335									
4371	125	FMT		369	339									
4400	200	FMT		370	87									
4406	201	FMT		371	108									
4410	202	FMT		372	93									
4416	300	FMT		373	125									
4422	301	FMT		374	118									
4430	302	FMT		375	121	126								
4433	400	FMT		376	131									
4442	401	FMT		377	238	241	244							
4446	402	FMT		378	217	227	232	341						
4467	403	FMT		379	234									
4453	404	FMT		380	239									
4457	405	FMT		381	242									
4463	406	FMT		382	223	228	233							
4467	407	FMT		383	256									
4476	408	FMT		384	257									
4505	409	FMT		385	258									
4511	410	FMT		386	259									
4515	411	FMT		387	260									
4521	500	FMT		388	225									
4527	510	FMT		389	230	235								

LOOPS	LABEL	INDEX	PROG-TO	LENGTH	PROPERTIES		
1140		J	100 100	218		EXT REFS	NOT INNER
1141		I	100 100	118		EXT REFS	
1205		J	101 101	138		EXT REFS	
1234		J	106 106	218		EXT REFS	NOT INNER
1245		I	106 106	118		EXT REFS	
1257	2	I	107 110	208		NOT INNER	
1270	9	J	111 113	48	INSTACK		
1302		J	115 115	138		EXT REFS	
1331		J	120 120	218		EXT REFS	NOT INNER
1332		I	120 120	118		EXT REFS	
1356		J	121 121	138		EXT REFS	
1406		J	127 127	218		EXT REFS	NOT INNER
1407		I	127 127	118		EXT REFS	
1433		J	128 128	138		EXT REFS	
1440	10	J	133 218	3628		EXT REFS	NOT INNER
1441	5	I	134 216	3518		EXT REFS	
2046	38	I	219 221	38	INSTACK		
2047		J	227 227	138		EXT REFS	
2116		J	232 232	138		EXT REFS	
2146	12	I	247 250	58	INSTACK		
2227		J	265 265	138		EXT REFS	
2256		J	269 269	138		EXT REFS	
2301		J	273 273	138		EXT REFS	
2326		J	277 277	138		EXT REFS	
2353		J	281 281	138		EXT REFS	
2400		J	285 285	138		EXT REFS	
2425		J	289 289	138		EXT REFS	
2452		J	293 293	138		EXT REFS	
2477		J	297 297	138		EXT REFS	
2524		J	301 301	138		EXT REFS	
2551		J	305 305	138		EXT REFS	
2576		J	309 309	138		EXT REFS	
2623		J	313 313	138		EXT REFS	
2650		J	317 317	138		EXT REFS	
2675		J	321 321	138		EXT REFS	
2722		J	325 325	138		EXT REFS	
2747		J	329 329	138		EXT REFS	
2774		J	333 333	138		EXT REFS	
3021		J	337 337	138		EXT REFS	
3046		J	341 341	138		EXT REFS	

COMMON BLOCKS LENGTH MEMBERS - BIAS NAME(LENGTH)

/ /	7	0 A	(1)	1 B	(1)	2 AN	(1)
		3 C	(1)	4 Q	(1)	5 CN	(1)
		6 DN	(1)				

STATISTICS

PROGRAM LENGTH	1016218	33681
BUFFER LENGTH	10008	512
SCM BLANK COMMON LENGTH	78	7
61000B SCM USED		

```
SUBROUTINE TAIL        76/76    OPT=1                    FTN 4.8+508/045    05 JAN 81 13.53.48        PAGE    1

                 SUBROUTINE TAIL(Y,QC,EL)                                                  FIX,213
                 COMMON A,B,AN,C,Q,CN,DN                                                   FIX,214
                 EL=Y                                                                      FIX,215
                 CM=DN*QC                                                                  FIX,216
                 CM=CM*CM                                                                  FIX,217
                 DO 5 I=1,19                                                               FIX,218
                 Y2=Y+CM/(Y+EL-CN)**2                                                      FIX,219
                 EL=(EL+Y2)*.5                                                             FIX,220
                 IF(ABS(Y2-EL)-.00025)10,5,5                                               FIX,221
               5 CONTINUE                                                                  FIX,222
              10 RETURN                                                                    FIX,223
                 END                                                                       FIX,224


      SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS      DEF LINE      REFERENCES
   3  TAIL           1            11

VARIABLES      SN  TYPE            RELOCATION
   0  A            REAL                / /          REFS        2
   2  AN           REAL                / /          REFS        2
   1  B            REAL                / /          REFS        2
   3  C            REAL                / /          REFS        2
  33  CM           REAL                             REFS        2*5        7    DEFINED        4        5
   5  CN           REAL                / /          REFS        2          7
   6  DN           REAL                / /          REFS        2          4
   0  EL           REAL                F.P.         REFS        7          8        9    DEFINED        1        3        8
  34  I          * INTEGER                       DEFINED        6
   4  Q            REAL                / /          REFS        2
   0  QC           REAL                F.P.         REFS        4    DEFINED        1
   0  Y            REAL                F.P.         REFS        3        2*7    DEFINED        1
  35  Y2           REAL                             REFS        8          9    DEFINED        7

INLINE FUNCTIONS    TYPE    ARGS        DEF LINE   REFERENCES
      ABS           REAL      1  INTRIN                 9

STATEMENT LABELS                DEF LINE    REFERENCES
   0  5                             10          6        2*9
  30  10                            11          9

LOOPS  LABEL     INDEX      FROM-TO     LENGTH     PROPERTIES
  13   5         I            6 10        15B        OPT      EXITS

COMMON BLOCKS    LENGTH      MEMBERS - BIAS NAME(LENGTH)
      / /          7                  0 A       (1)                1 B       (1)                2 AN      (1)
                                      3 C       (1)                4 Q       (1)                5 CN      (1)
                                      6 DN      (1)

STATISTICS
  PROGRAM LENGTH                  41B       33
  SCM BLANK COMMON LENGTH          7B        7
```

-50-

STATISTICS

61000B SCM USED

```
SUBROUTINE HEAD        76/76    OPT=1                    FTN 4.8+508/045    05 JAN 81 13.53.48        PAGE     1

                SUBROUTINE HEAD(Y,Y1)                                                  HEAD.2
                COMMON A,B,AN,Y2,Q                                                     FIX.225
                AM=1./AN                                                               HEAD.4
                BM=1.5/AN                                                              HEAD.5
                CM=(Q/A)**AM                                                           HEAD.6
                DO 5 I=1,19                                                            FIX.226
                Y1=Y2                                                                  FIX.227
                X=Y1+Y                                                                 FIX.228
                Y2=CM/(X-B)**BM+.09                                                    FIX.229
                Y2=(Y1+Y2)*.5                                                          FIX.230
                IF(ABS(Y2-Y1)-.0005)10,5,5                                             FIX.231
              5 CONTINUE                                                               HEAD.11
             10 Y1=Y2                                                                  FIX.232
                RETURN                                                                 FIX.233
                END                                                                    HEAD.13


      SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS      DEF LINE      REFERENCES
    3  HEAD           1            14

VARIABLES      SN  TYPE            RELOCATION
    0  A           REAL                / /          REFS        2        5
   43  AM          REAL                             REFS        5   DEFINED        3
    2  AN          REAL                / /          REFS        2        3        4
    1  B           REAL                / /          REFS        2        9
   44  BM          REAL                             REFS        9   DEFINED        4
   45  CM          REAL                             REFS        9   DEFINED        5
   46  I         * INTEGER                       DEFINED       6
    4  Q           REAL                / /          REFS        2        5
   47  X           REAL                             REFS        9   DEFINED        6
    0  Y           REAL                F.P.         REFS        8   DEFINED        1
    0  Y1          REAL                F.P.         REFS        8       10       11   DEFINED        1        7       13
    3  Y2          REAL                / /          REFS        2        7       10       11       13
                                                  DEFINED       9       10

INLINE FUNCTIONS    TYPE    ARGS        DEF LINE   REFERENCES
      ABS          REAL       1  INTRIN                11

STATEMENT LABELS                DEF LINE    REFERENCES
    0  5                           12          6        2*11
   34  10                          13         11

LOOPS  LABEL     INDEX      FROM-TO     LENGTH     PROPERTIES
   15  5         I            6 12        178                EXT REFS     EXITS

COMMON BLOCKS    LENGTH     MEMBERS - BIAS NAME(LENGTH)
      / /          5                 0 A       (1)                1 B       (1)                2 AN      (1)
                                     3 Y2      (1)                4 Q       (1)
```

STATISTICS

PROGRAM LENGTH	548	44
SCM BLANK COMMON LENGTH	58	5
61000B SCM USED		

```
      SUBROUTINE PTITLE ( III, NAM, MAXNCD, ITITLE, NCD, JJJ )                PTITLE.2
C     24 SEP 1976                                                             PTITLE.3
C                                                                             PTITLE.4
C     PURPOSE -                                                               PTITLE.5
C        SUBROUTINE TO READ AND WRITE DATE TIME AND TITLE                     PTITLE.6
C                                                                             PTITLE.7
C     USAGE -                                                                 PTITLE.8
C        CALL    PTITLE ( III, NAM, MAXNCD, ITITLE, NCD, JJJ )                PTITLE.9
C                                                                             PTITLE.10
C     DESCRIPTION OF PARAMETERS -                                             PTITLE.11
C        III     - INPUT JUMP INDEX                                           PTITLE.12
C                  1 READ DATE AND TIME                                       PTITLE.13
C                  2 READ TITLE AND TEST FOR BLANK                            PTITLE.14
C                  3 PRINT DATE TIME AND TITLE                                PTITLE.15
C        NAM     - INPUT VECTOR OF LENGTH 27 CONTAINING PROGRAM NAME          PTITLE.16
C        MAXNCD  - INPUT MAX NUMBER OF TITLE CARDS                            PTITLE.17
C        ITITLE  - OUTPUT VECTOR OF LENGTH 27 * NCD CONTAINING RUN TITLE      PTITLE.18
C        NCD     - OUTPUT NUMBER OF TITLE CARDS                               PTITLE.19
C        JJJ     - OUTPUT END OF FILE INDICATOR 1 NO 2 YES                    PTITLE.20
C                                                                             PTITLE.21
C     REMARKS -                                                               PTITLE.22
C        WRITTEN FOR UNIVAC 1108                                              PTITLE.23
C                                                                             PTITLE.24
C        INPUT CARDS IN FOLLOWING ORDER                                       PTITLE.25
C                                                                             PTITLE.26
C        READ  1000 - MAXNCD CARDS MAX                                        PTITLE.27
C         COL      FMT      VAR    DESCRIPTION                               PTITLE.28
C        01-80 26A3,A2  ITITLE   TITLE OF RUN                                 PTITLE.29
C                                                                             PTITLE.30
C     NAM    MUST BE DIMENSIONED 27 IN CALLING PROGRAM                        PTITLE.31
C     ITITLE MUST BE DIMENSIONED 27 * NCD IN CALLING PROGRAM                  PTITLE.32
C                                                                             PTITLE.33
C     SUBROUTINES AND FUNCTION SUBPROGRAMS REQUIRED -                         PTITLE.34
C        STDMY                                                                PTITLE.35
C                                                                             PTITLE.36
C     METHOD -                                                                PTITLE.37
C                                                                             PTITLE.38
C                                                                             PTITLE.39
      DIMENSION NAM(1), ITITLE(1)                                             PTITLE.40
C                                                                             PTITLE.41
      DATA IBK/3H   /                                                         PTITLE.42
C                                                                             PTITLE.43
      JJJ = 1                                                                 PTITLE.44
C                                                                             PTITLE.45
      IF ( III - 2 ) 10,20,80                                                 PTITLE.46
C                                                                             PTITLE.47
C     READ SYSTEM DATE AND TIME                                               PTITLE.48
C     -------------------------                                               PTITLE.49
   10 CALL STDMY(IDAY,IMON,IYR,IHR)                                           PTITLE.50
      RETURN                                                                  PTITLE.51
C                                                                             PTITLE.52
C     READ TITLE OF RUN AND TEST FOR BLANK                                    PTITLE.53
C     ------------------------------------                                    PTITLE.54
   20 DO 40 J=1,MAXNCD                                                        PTITLE.55
      N = J * 27                                                              PTITLE.56
```

```
                      M = N + 26                                                PTITLE,57
                      READ  1000, ( ITITLE(I),I=M,N )                           PTITLE,58
                C                                                               PTITLE,59
                      DO 30 I=M,N                                               PTITLE,60
   60                 IF( ITITLE(I) = IBK ) 40,30,40                            PTITLE,61
                   30 CONTINUE                                                  PTITLE,62
                C                                                               PTITLE,63
                      GO TO 50                                                  PTITLE,64
                C                                                               PTITLE,65
   65              40 CONTINUE                                                  PTITLE,66
                C                                                               PTITLE,67
                      J = MAXNCD + 1                                            PTITLE,68
                C                                                               PTITLE,69
                   50 NCD = J - 1                                               PTITLE,70
   70                 IF( NCD ) 60,60,70                                        PTITLE,71
                      60 JJJ = 2                                                PTITLE,72
                      70 RETURN                                                 PTITLE,73
                C                                                               PTITLE,74
                C     PRINT DATE TIME AND TITLE                                 PTITLE,75
   75           C     -------------------------                                 PTITLE,76
                   80 PRINT 1050, ( NAM(I),I=1,27 ), IDAY, INON, IYR, IHR       PTITLE,77
                      N = NCD + 27                                              PTITLE,78
                      PRINT 2000, ( ITITLE(I),I=1,N )                           PTITLE,79
                      RETURN                                                    PTITLE,80
   80           C                                                               PTITLE,81
                C     FORMAT STATEMENTS                                         PTITLE,82
                C     -----------------                                         PTITLE,83
                1000 FORMAT ( 26A3,A2 )                                         PTITLE,84
                1050 FORMAT ( 1H1,9X,26A3,A2 / 5X,I2,1X,A3,2I5)                 PTITLE,85
   85           2000 FORMAT ( 5X,26A3,A2 )                                      PTITLE,86
                      END                                                       PTITLE,87
```

CARD NR, SEVERITY DETAILS DIAGNOSIS OF PROBLEM

76 I ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS DEF LINE REFERENCES
3 PTITLE 1 50 72 79

VARIABLES	SN	TYPE	RELOCATION								
131	I	INTEGER		REFS	57	60	76	78	DEFINED	57	59
47	IBK	INTEGER		REFS	76	78					
172	IDAY	INTEGER		REFS	60	DEFINED	61				
175	IHR	INTEGER		REFS	49	79					
0	III	INTEGER	F,P,	REFS	45	DEFINED	1				

VARIABLES	SN	TYPE	RELOCATION										
123	IMON	INTEGER			REFS	49	76						
0	ITITLE	INTEGER	ARRAY	F.P.	REFS	39	40	78	DEFINED	1	57		
124	IYR	INTEGER			REFS	49	76						
126	J	INTEGER			REFS	55	69	DEFINED	54	67			
0	JJJ	INTEGER		F.P.	DEFINED	1	43	71					
130	M	INTEGER			REFS	57	59	DEFINED	56				
0	MAXNCO	INTEGER		F.P.	REFS	54	67	DEFINED	1				
127	N	INTEGER			REFS	56	57	59	78	DEFINED	55	77	
0	NAM	INTEGER	ARRAY	F.P.	REFS	39	76	DEFINED	1				
0	NCO	INTEGER		F.P.	REFS	70	77	DEFINED	1	69			

FILE NAMES	MODE			
INPUT	FMT	READS	57	
OUTPUT	FMT	WRITES	76	78

EXTERNALS	TYPE	ARGS	REFERENCES
STOMY		6	49

STATEMENT LABELS			DEF LINE	REFERENCES	
0	10	INACTIVE	49	45	
15	20		58	45	
0	30		61	59	60
35	40		65	54	2*60
42	50		69	63	
0	60	INACTIVE	71	2*70	
47	70		72	70	
50	80		76	45	
111	1000	FMT	83	57	
113	1050	FMT	84	76	
117	2000	FMT	85	78	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES			
16	60	J	54 65	228		EXT REFS	EXITS	NOT INNER
30	50	I	59 61	58	INSTACK	EXITS		

STATISTICS
PROGRAM LENGTH 1368 94
61000B SCM USED

```
      SUBROUTINE STDMY ( IDAY, JMO, IYR, JHR )                          STDMY.2
C     06 OCT 1976                                                       STDMY.3
C                                                                       STDMY.4
C     PURPOSE -                                                         STDMY.5
C        DATE TIME SUBROUTINE FOR CDC 6000 OR 7600 AT LBL               STDMY.6
C                                                                       STDMY.7
C     USAGE -                                                           STDMY.8
C        CALL STDMY ( IDAY, JMO, IYR, JHR )                             STDMY.9
C                                                                       STDMY.10
C     DESCRIPTION OF PARAMETERS -                                       STDMY.11
C        IDAY     - DAY - INTEGER VARIABLE                              STDMY.12
C        JMO      - MONTH - ALPHA VARIABLE                              STDMY.13
C        IYR      - LAST TWO DIGITS OF THE YEAR - INTEGER VARIABLE      STDMY.14
C        JHR      - TIME ELAPSED SINCE 1200 MIDNIGHT - INTEGER VARIABLE STDMY.15
C                                                                       STDMY.16
C     REMARKS -                                                         STDMY.17
C        DATE HOUR ARE CDC DATE/TIME SUBROUTINES FOR CDC 6000 OR 7600   STDMY.18
C        FORTRAN EXTENDED (FTN4) REFERENCE MANUAL LBL I-8-9             STDMY.19
C        PRINT FORMAT I2,1X,A3,I3,I5                                    STDMY.20
C                                                                       STDMY.21
C     SUBROUTINES AND FUNCTION SUBPROGRAMS REQUIRED -                   STDMY.22
C        DATE HOUR                                                      STDMY.23
C                                                                       STDMY.24
C     METHOD -                                                          STDMY.25
C                                                                       STDMY.26
C                                                                       STDMY.27
      CALL DATE ( IDATE )                                               STDMY.28
      DECODE ( 10, 1000, IDATE ) IDAY, IMON, IYR                        STDMY.29
      JMO = IMON                                                        STDMY.30
C                                                                       STDMY.31
      CALL HOUR ( ITIME )                                               STDMY.32
      DECODE ( 10, 1010, ITIME ) IHR, IMIN, ISEC                        STDMY.33
      IF( ISEC - 30 ) 20,20,10                                          STDMY.34
   10 IMIN = IMIN + 1                                                   STDMY.35
   20 JHR = IHR * 100 + IMIN                                            STDMY.36
C                                                                       STDMY.37
C     FORMAT STATEMENTS                                                 STDMY.38
C     -----------------                                                 STDMY.39
 1000 FORMAT ( 1X,I2,1X,A3,1X,I2 )                                      STDMY.40
 1010 FORMAT ( 1X,I2,1X,I2,1X,I2 )                                      STDMY.41
      END                                                               STDMY.42
```

SYMBOLIC REFERENCE MAP (R=3)

```
ENTRY POINTS      DEF LINE      REFERENCES
   3  STDMY          1            41

VARIABLES      SN  TYPE          RELOCATION
  57  IDATE        INTEGER                        REFS        27        28
   0  IDAY         INTEGER              F.P.    DEFINED        1        28
  62  IHR          INTEGER                        REFS        35   DEFINED       32
```

VARIABLES	SN	TYPE	RELOCATION							
63	IMIN	INTEGER		REFS	34	35	DEFINED	32	34	
60	IMON	INTEGER		REFS	29	DEFINED	28			
60	ISEC	INTEGER		REFS	33	DEFINED	32			
61	ITIME	INTEGER		REFS	31	32				
0	IYR	INTEGER	F.P.	DEFINED	1	26				
0	JMO	INTEGER	F.P.	DEFINED	1	35				
0	JMO	INTEGER	F.P.	DEFINED	1	29				

EXTERNALS	TYPE	ARGS	REFERENCES
DATE		1	27
HOUR		1	31

STATEMENT LABELS			DEF LINE	REFERENCES
0	10	INACTIVE	38	33
22	20		35	2*33
50	1000	FMT	39	28
53	1010	FMT	40	32

STATISTICS

PROGRAM LENGTH 658 53

61000B SCM USED

LOAD MAP. LINK - BKY A000/7000 8.4 05 JAN 81 13.54.00 PAGE 1

FL REQUIRED TO LOAD 124100
FL REQUIRED TO RUN 112000
INITIAL TRANSFER TO P4824 = 1221

BLOCK ASSIGNMENTS.

BLOCK	ADDRESS	LENGTH	FILE
P#R2#	100	102621	LGO
TAIL	102721	41	LGO
HEAD	102762	54	LGO
PTITLE	103036	136	LGO
STOMV	103174	65	LGO
/STP,END/	103261	1	
/PCL,C,/	103262	26	
/QLINLMT/	103310	1	
/QJOBSFL/	103311	2	
/Q#SAFLG/	103313	1	
/,QCOMP,/	103314	1	
/Q#,ID,/	103315	171	
FTN#LIB	103506	1	FTN#LIB
ALOG,	103507	63	FTN#LIB
CIO#	103572	13	FTN#LIB
CLOCK#	103605	43	FTN#LIB
COMIO#	103650	60	FTN#LIB
DECODE#	103730	115	FTN#LIB
END,#	104045	2	FTN#LIB
EXP,	104047	73	FTN#LIB
EXP,MSG	104142	16	FTN#LIB
FECMSK#	104160	41	FTN#LIB
FLTIN#	104221	156	FTN#LIB
FLTOUT#	104377	316	FTN#LIB
FMTAP#	104713	406	FTN#LIB
FORSYS#	105321	662	FTN#LIB
/QOVERL#/	106203	1	
FORUTL#	106204	16	FTN#LIB
F,OPEN	106222	120	FTN#LIB
F,READF	106342	170	FTN#LIB
F,WRITF	106532	122	FTN#LIB
GETFIT#	106654	43	FTN#LIB
GETFP,	106717	60	FTN#LIB
HOURS	106777	14	FTN#LIB
INCOM#	107013	262	FTN#LIB
INPC#	107275	234	FTN#LIB
KODER#	107531	536	FTN#LIB
KRAKER#	110267	435	FTN#LIB
OUTCOM#	110724	242	FTN#LIB
OUTC#	111166	155	FTN#LIB
OZNTRY#	111343	31	FTN#LIB
RDD#	111376	23	FTN#LIB
SPA#	111417	11	FTN#LIB
SYS#ID#	111430	1	FTN#LIB

-59-

BLOCK ASSIGNMENTS.

BLOCK	ADDRESS	LENGTH	FILE
SYS=	111431	34	FTN4LIB
SYS=AID	111465	7	FTN4LIB
SYS=1ST	111474	62	FTN4LIB
UZERO..	111556	2	FTN4LIB
=TM=	111560	30	FTN4LIB
=TO=	111610	17	FTN4LIB
4TM=	111627	66	FTN4LIB
XTOV.	111715	32	FTN4LIB
//	111747	7	

```
13.53.45. GOLES18.  05 JAN 81   7600Z  RKY29P V0   GOL      NORM          804045 EYAS 724F3
13.53.45. GOLES18. GOL ,804045,EYAS 724F3031 COMPILE PROGRAM FROM UPDATE
13.53.45. GOLES18. *INPUT 6600R 13.51.48. 05 JAN 81  VIA COKE
13.53.45. GOLES18.  COPY,INPUT,1R,CONTROL/BR,DFM=OFF.
13.53.45. GOLES18.  FLS=020K  FLL=0000K  LCM BUFFERS=0054K  TOTAL LCM=0074K
13.53.45. GOLES18.   CONTROL DISK 2
13.53.45. GOLES18.  COPY COMPLETE.
13.53.45. GOLES18. (COMPILE PROGRAM FROM UPDATE/724F3031/LARSEN
13.53.45. GOLES18. FETCHGS,OLDPL=LAKEREG/P4824/NEWPL,13864.
13.53.46. GOLES18.  FLS=060K  FLL=0000K  LCM BUFFERS=0054K  TOTAL LCM=0134K
13.53.47. GOLES18.   OLDPL   DISK 1
13.53.47. GOLES18.  OLDPL            2103 WORDS COPIED FROM CACHE.
13.53.47. GOLES18.   CACHE22 RETURNED       6 BLD, BS= 0040B,FS=140641B
13.53.47. GOLES18.   ZZZZZFN DISK 2
13.53.47. GOLES18.   ZZZZZFN UNLOADED       1 BLD, BS= 0040B,FS=000001B
13.53.47. GOLES18.   TAPEPAC RETURNED       0 BLD, BS= 0002B,FS=000000B
13.53.47. GOLES18.   ZZZZZFN RETURNED       1 BLD, BS= 0040B,FS=000001B
13.53.47. GOLES18. UPDATE,Q,L=0.
13.53.47. GOLES18.  UPDATE 1.2 -- VERSION 410-1H
13.53.47. GOLES18.   COMPILE DISK 1
13.53.47. GOLES18.  READING SEQUENTIAL OLDPL.
13.53.47. GOLES18.  COPYING OLDPL TO RANDOM FILE
13.53.47. GOLES18.   UPDTTPL DISK 2
13.53.48. GOLES18.   UPDTTPL RETURNED       0 BLD, BS= 0040B,FS=000005B
13.53.48. GOLES18.  UPDATE COMPLETE.
13.53.48. GOLES18. FTN4,I=COMPILE,R=3.
13.53.48. GOLES18.  FLS=061K  FLL=0000K  LCM BUFFERS=0242K  TOTAL LCM=0323K
13.53.48. GOLES18.   OUTPUT  DISK 1
13.53.48. GOLES18. COMPILING P4824
13.53.48. GOLES18.   ZZZZZFC DISK 2
13.53.48. GOLES18.   ZZZZZRL DISK 1
13.53.49. GOLES18.   ZZZZZRM DISK 1
13.53.50. GOLES18.   LGO     DISK 1
13.53.51. GOLES18. COMPILING TAIL
13.53.51. GOLES18. COMPILING HEAD
13.53.51. GOLES18. COMPILING PTITLE
13.53.51. GOLES18. COMPILING STDMY
13.53.51. GOLES18.   ZZZZZRL RETURNED       0 BLD, BS= 0040B,FS=000001B
13.53.51. GOLES18.   ZZZZZRM RETURNED       0 BLD, BS= 0040B,FS=000001B
13.53.51. GOLES18.   ZZZZZFC RETURNED       0 BLD, BS= 0040B,FS=000001B
13.53.51. GOLES18.  COMPILATION COMPLETE. CP SEC     .584
13.53.51. GOLES18.   FTN4    RETURNED       1 BLD, BS= 0160B,FS=000160B
13.53.51. GOLES18. FETCHGS,BSECSE=PLAN77/LLO50/CD32/WEL07,24643.
13.53.51. GOLES18.  FLS=060K  FLL=0000K  LCM BUFFERS=0202K  TOTAL LCM=0262K
13.53.52. GOLES18.   BSECSE  DISK 1
13.53.54. GOLES18.  BSECSE           60355 WORDS COPIED FROM CACHE.
13.53.54. GOLES18.   CACHE22 RETURNED       9 BLD, BS= 0040B,FS=140641B
13.53.54. GOLES18.   ZZZZZFN DISK 2
13.53.54. GOLES18.   ZZZZZFN UNLOADED       1 BLD, BS= 0040B,FS=000001B
13.53.54. GOLES18.   TAPEPAC RETURNED       0 BLD, BS= 0002B,FS=000000B
13.53.54. GOLES18.   ZZZZZFN RETURNED       1 BLD, BS= 0040B,FS=000001B
13.53.54. GOLES18. COPY,INPUT,1RXA,BSECSE,1RXA,INPUT,1RXB,BSECSE/BR,1RS,1RXB,1RS,1RXB,BSECSE/BU,3RS
13.53.54. GOLES18. +,1RXA,INPUT,1RXA,INP/RR,DFM=OFF.
13.53.54. GOLES18.  FLS=020K  FLL=0000K  LCM BUFFERS=0202K  TOTAL LCM=0222K
13.53.54. GOLES18.   INP     DISK 1
13.53.54. GOLES18.           1 RECORD(S) SKIPPED--BSECSE
13.53.54. GOLES18.           1 RECORD(S) SKIPPED--BSECSE
13.53.54. GOLES18.           3 RECORD(S) SKIPPED--BSECSE
13.53.54. GOLES18.   BSECSE  UNLOADED       8 BLD, BS= 0040B,FS=000167B
13.53.54. GOLES18.  COPY COMPLETE.
13.53.54. GOLES18. LGO,INP,OUT.
13.53.55. GOLES18.   ZZZZZLS DISK 2
```

-61-

```
13.53.55. GOLES18.   ZZZZZLS DISK 2
13.53.55. GOLES18.   ZZZZZLS RETURNED       0 BLD, BS= 0040B,FS=000000B
13.53.55. GOLES18.  FLS=112K  FLL=0000K  LCM BUFFERS=0214K  TOTAL LCM=0326K
13.53.55. GOLES18.  FLS=122K  FLL=0000K  LCM BUFFERS=0214K  TOTAL LCM=0336K
13.54.00. GOLES18.  FLS=132K  FLL=0000K  LCM BUFFERS=0314K  TOTAL LCM=0446K
13.54.00. GOLES18.   DBGMAP  DISK 1
13.54.00. GOLES18.   DBGMAP  UNLOADED       1 BLD, BS= 0040B,FS=000001B
13.54.00. GOLES18.   LGO     UNLOADED       1 BLD, BS= 0040B,FS=000006B
13.54.00. GOLES18.   FTN4LIB UNLOADED       1 BLD, BS= 0100B,FS=000100B
13.54.00. GOLES18.  LOAD COMPLETE, LINK 8.4.
13.54.00. GOLES18.    TIME---        63 MSEC.
13.54.00. GOLES18.    MEMORY-      LOAD    124100,  EXECUTE    112000.
13.54.00. GOLES18.  FLS=112K  FLL=0000K  LCM BUFFERS=0154K  TOTAL LCM=0266K
13.54.00. GOLES18.        BEGIN PROGRAM P4B24      USING -
13.54.00. GOLES18.           FTN4 LIBRARY 7600-VSN2/80242.21.31
13.54.00. GOLES18.   OUT     DISK 2
13.54.02. GOLES18.     STOP
13.54.02. GOLES18.      1.229 CP SECONDS EXECUTION TIME
13.54.02. GOLES18.      4.858 COMPUTING UNITS USED
13.54.02. GOLES18.   LINK    RETURNED       1 BLD, BS= 0012B,FS=000012B
13.54.02. GOLES18.   FTN4LIB RETURNED       1 BLD, BS= 0100B,FS=000100B
13.54.02. GOLES18. DISPOSE,OUT=PR,DT=I,T=(SOO POWER/PLAN 77/BASE CASE).
13.54.02. GOLES18.  FLS=060K  FLL=0000K  LCM BUFFERS=0242K  TOTAL LCM=0322K
13.54.03. GOLES18.   OUT     UNLOADED       3 BLD, BS= 0040B,FS=000057B
13.54.03. GOLES18.   TAPEPAC DISK 1
13.54.03. GOLES18.   TAPEPAC UNLOADED       1 BLD, BS= 0002B,FS=000001B
13.54.17. GOLES18.   TAPEPAC RETURNED       1 BLD, BS= 0002B,FS=000001B
13.54.17. GOLES18.   OUT     QUEUED PR 372
13.54.17. GOLES18.   STATION RETURNED       1 BLD, BS= 0002B,FS=000001B
13.54.17. GOLES18.   OUT     DELETED        3 BLD, BS= 0040B,FS=000057B
13.54.17. GOLES18. EXIT.
13.54.17. GOLES18.  SKIP PAST FIN.     CARD
13.54.17. GOLES18.   OUTPUT  QUEUED PR      2 BLD, BS= 0020B,FS=000026B
13.54.17. GOLES18.  AJ AE13510   804045N 05JAN81RZ N 000023          EYAS 724F3
13.54.17. GOLES18.  ..............................
13.54.17. GOLES18.  SECTORS TRANSFERRED        561
13.54.17. GOLES18.  MAX DISK SECTORS           650
13.54.17. GOLES18.  CP SECONDS               2,051
13.54.17. GOLES18.  SYSTEM SECONDS           0,367
13.54.17. GOLES18.  OLD BLD"S                   17
13.54.17. GOLES18.  LCM BUFFER LOADS            23
13.54.17. GOLES18.  ITO CUS                      3
13.54.17. GOLES18.  KWORDS XFERRED             290
13.54.17. GOLES18.  CIO CALLS                  739
13.54.17. GOLES18.  STAGING CUS                  0
13.54.17. GOLES18.  ..............................
13.54.17. GOLES18.  TOTAL JOB CUS               23
13.54.17. GOLES18.  COST + OVERHEAD    $      1.56
13.54.17. GOLES18.  ..............................

13.54.34. GOLES18.  OUTPUT  QUEUED PR 173
```

-62-

B I L L B O A R D WRITEUPS SUBSET BKYNEWS WAS LAST CHANGED DEC 22
HANDBOOK SUBSET CHANGES WAS LAST CHANGED JAN 1 1981

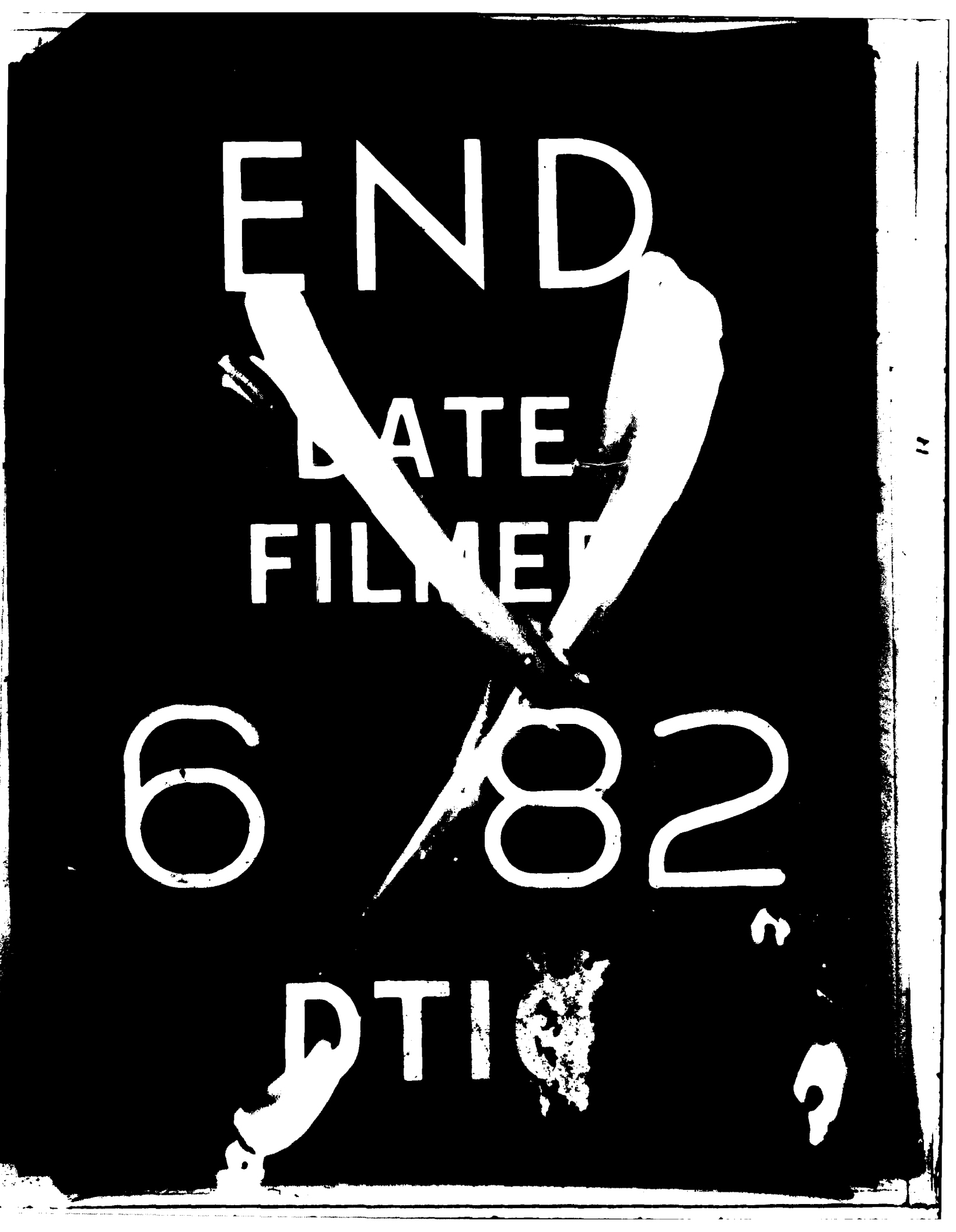
DEC 22 PSS DISKS TO BE MOVED ON DEC 29
THE PSS DISKS ARE SCHEDULED TO BE PHYSICALLY MOVED ON MONDAY, DEC, 29. WE ANTICIPATE NO PROBLEMS. HOWEVER, CAUTIOUS USERS MAY WANT TO BACKUP THEIR PSS LIBRARIES. SEE HANDBOOK SUBSET STORAGE FOR THE RECOMMENDED METHOD.

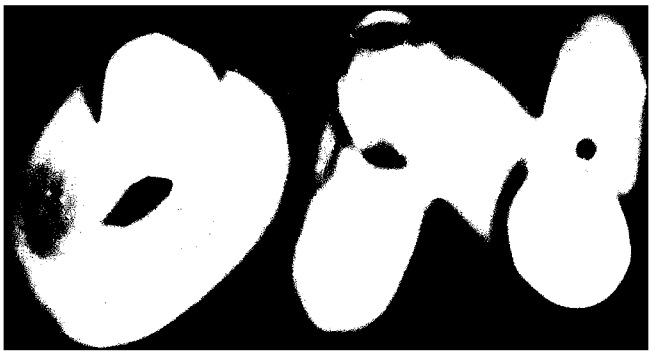
DEC 12 NEW HOURS FOR TAPE SERVICES
BEGINNING IN JAN., 1981, TAPE SERVICES WILL ONLY BE OPEN ON WEEKDAYS, MONDAY TO FRIDAY, FROM 8 AM TO MIDNIGHT. THIS MEANS THAT TAPE TRANSACTIONS WHICH REQUIRE A TAPE LIBRARIAN CAN ONLY BE DONE DURING THOSE HOURS. TAPE TRANSACTIONS WHICH ARE DONE WITH CONTROL CARDS CAN OF COURSE BE DONE AT ANY TIME. BKYNEWS AND THE NEWSLETTER WILL HAVE MORE INFO. CALL TAPE SERVICES IF YOU HAVE QUESTIONS, x-6218.

NOV 18 ATTENTION DICOMED USERS
BECAUSE OF A NEWLY DISCOVERED BUG IN STAGE, YOUR STAGE CARD FOR ROUTING DICOMED OUTPUT SHOULD HAVE THE PARAMETER OFXF AND NOT OFXB. FOR EXAMPLE,
STAGE,FILM,LIBNO,OFXF,QT,W.

OCT 14 VARIAN PLOTTER AVAILABLE
A NEW VARIAN ELECTROSTATIC PLOTTER IS NOW AVAILABLE TO GRAPPAC AND IDDS USERS. FOR THE TIME BEING VARIAN PLOTS ARE FREE. DIRECTIONS FOR USING THE PLOTTER ARE GIVEN IN THE NOVEMBER ISSUE OF THE COMPUTER CENTER NEWSLETTER AND IN BKYNEWS.

TO CALL A CONSULTANT DIAL x5981, (415) 486-5981 OR 451-5981 (FTS)


END
DATE
FILME
6 82
DTI



AD-A114 589 INTERNATIONAL LAKE ERIE REGULATION STUDY BOARD F/G 13/2
LAKE ERIE WATER LEVEL STUDY. APPENDIX E. POWER. ANNEX D. COMPUT--ETC(U)
JUL 81

UNCLASSIFIED NL

DA
145

SUPPLEMENTARY

INFORMATION

Errata

AD-A114 589

Pages 361 thru 370 are not available because they are oversized colored illustrations.

DTIC-DDA-2
28 Jul 82